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Diffusion of Mobile Payment Systems among Microentrepreneurs in Kenya and Tanzania

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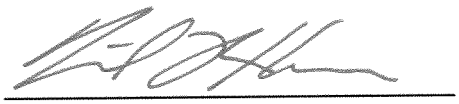

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ABSTRACT

Nowhere has the use of mobile phones for money transfer become more ubiquitous than in Kenya. Developed by Vodafone and launched in 2007 by its Kenyan affiliate Safaricom, M-PESA has transformed how money flows throughout Kenya. Similar systems are only slowly gaining traction elsewhere on the continent of Africa. Such "mobile money" networks lie at the intersection of finance and telecommunications, embracing a number of stakeholders: mobile network operators, financial institutions, and regulators along with supporting businesses, air time agents, telecom retailers, and users. Mobile payments have garnered much attention in recent years as a means of promoting financial inclusion, reducing transactions costs, and decreasing personal and financial risk.

There has also been much discussion about the importance of microenterprises (businesses with ten or fewer employees) to livelihoods and poverty alleviation in the developing world. In developing economies, microenterprises provide a significant portion of income generation and employment. For instance, nearly 90 percent of all businesses in Africa are microenterprises. Some research suggests that microenterprises may contribute to poverty reduction by expanding employment opportunities, improving income generation for the extreme poor, and making markets work better for the poor. However, not all microenterprises have the same potential for growth. Nevertheless, many low-growth microenterprises, while remaining small, will deliver benefits in terms of livelihood assets.

While mobile payments have proven effective and efficient for person-to-person (P2P) transfers, the impact of mobile payments on microenterprises are less clear. This thesis will examine adoption and use of mobile payments among microentrepreneurs in Kenya and Tanzania. This study is presented from two perspectives. First, the study compares and contrasts

microenterprises in Kenya with those in neighboring Tanzania in terms of mobile payment use and perceived impact on business development and wealth creation. Second, the Technology Acceptance Model (TAM) framework is used to identify the key constructs underlying mobile payment adoption among microentrepreneurs. The following constructs were analyzed: perceived ease of use, perceived usefulness, perceived trust, perceived reliability, perceived safety, perceived financial cost, and a subjective norm. The survey method was used to collect data on 331 microenterprises in Kenya and Tanzania. This data was supplemented by an additional 15 in-depth interviews.

This thesis makes clear that perceptions about mobile payments differ between microentrepreneurs in the two countries. In Kenya, perceptions appear to be based on personal experience with mobile payments, whereas, with little personal experience, Tanzanians' perceptions appear to be based on second-hand information. These differences have significant impacts on each group's ultimate use of mobile payments. For example, on average, Kenyan microenterprises have used mobile payments for business purposes four times as long as Tanzanians have. This thesis also reveals a model for mobile payment adoption among microentrepreneurs. The model, an extension of TAM, includes the additional constructs of perceived trust, perceived safety, and subjective norm. TAM's value lies in its parsimony and robustness; however, this thesis shows that a small increase in the number of constructs is necessary for the proposed model to be suitable for the context of mobile payment use by microentrepreneurs in the developing world.

This thesis contributes to the literature in a number of ways. While TAM and its extensions have been widely used to describe technology adoption, few studies have focused on technology adoption in the developing world. The model presented here provides a basis for

understanding mobile payment adoption among this population. Finally, this study highlights key differences between Kenya and Tanzania in terms of adoption, use, and impact of mobile payments. Not every market will adopt mobile payments at the same rate as Kenya. Understanding differences in perceptions and behaviors provides insight into the strategies needed to foster more effective uptake of mobile payments elsewhere in the developing world.

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This work began over a year ago as a self-challenge. I sought to challenge myself academically and especially to find a way to integrate my seemingly diverse interests – technology, international relations, and poverty alleviation. A few conversations with Dr. Daniel R. Horne provided the first steps towards this work. Thus I would like to thank him for his advice, support, and vision throughout this process. I would also like to thank Dr. Mark DeFanti for always challenging me. His support and insight were instrumental. They are both unbelievable assets to Providence College!

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
ATM	Automated Teller Machine
B2B	Business-to-business
B2C	Business-to-consumer
BoP	Base of the Pyramid, Bottom of the Pyramid
C2B	Consumer-to-business
CAM	Compass Acceptance Model
CBK	Central Bank of Kenya
CKW	Community Knowledge Worker
GDP	Gross Domestic Product
GII	Gender Inequality Index
GNI	Gross National Income
HDI	Human Development Index
ICT	Information and Communication Technology
IEBC	Independent Electoral and Boundary Commission
KIHBS	Kenya Integrated Household Budget Survey
KSh	Kenyan Shillings
LDC	Least Developed Country
MDGs	Millennium Development Goals
MP	Mobile Payment
NFC	Near Field Communication
OEX	Outcome expectations
P2P	Person-to-person
PEOU	Perceived ease of use
PFC	Perceived financial cost
PIN	Personal Identification Number
PR	Perceived reliability
PS	Perceived safety
PT	Perceived trust
PU	Perceived usefulness
SIM	Subscriber Identity Module
SMS	Short Messaging Services
SN	Subjective norm
TAM	Technology Acceptance Model
TSh	Tanzanian Shillings
UN	United Nations

CHAPTER 1: INTRODUCTION

Overview

Access to and use of information and communication technology (ICT) including telephones, mobile phones, personal computers, and the Internet has had important positive effects on economic growth in both developed and developing nations. Many studies have addressed the link between ICT, specifically phones, and economic growth. Hardy (1980) conducted one of the earliest investigations of the telephone's role in economic development. He concluded that the telephone facilitates economic development given its ability to diffuse information and to enhance organizational structures. Roller and Waverman (2001) explored the relationship between telecommunications infrastructure investments and economic performance. These researchers found that once a telecommunications infrastructure critical mass is achieved, there is a positive and significant link between said infrastructure and economic growth.

In less than 20 years, the world has seen the proliferation of mobile phone technology such that its use has become ubiquitous in every aspect of people's personal and professional lives. It affords increased portability and flexibility and is of particular interest due to its high rates of growth, its lower infrastructure requirements, and its reduced adoption costs compared with other ICT. (Chircu & Mahajan, 2009) In developed economies, mobile phone technology not only provides the added value of mobility, but also affords digital inclusion. Specifically, mobile phone technology in developed economies has fostered the digital inclusion of disenfranchised consumers through pay-as-you-go service plans, including voice, text, video, and web browsing, unavailable for fixed lines. (Waverman, Meschi, & Fuss, 2005) These prepaid services allow mobile customers to pay for small as-needed access instead of having to commit to fixed monthly subscriptions. (Qiang, 2009)

Even as developed economies have benefited from the market penetration of mobile phone technology, studies indicate that the impact of such technology on developing economies is particularly strong. According to a 2009 World Bank econometrics analysis of 120 countries, for every 10-percentage-point increase in the penetration of mobile services in low- or middle-income economies, there is an increase in economic growth of 0.81 percent. (Qiang & Rossotto, 2009; Khalil, Dongier, & Qiang, 2009) An earlier study conducted by Waverman et al. (2005) suggests that mobile phone technology has an impact on economic growth in developing economies that is twice as large as that on developed economies. They found this increased growth stemmed from the use of mobile phones in developing economies as substitutes for fixed lines. For developing economies with low levels of landline telephony penetration, mobile telephony is seen as a leapfrogging tool. For individuals in developing economies, mobile phone technology has contributed to enhanced social, political, and economic access. (World Bank, 2012a) For instance, mobile phones have helped in the monitoring of elections and in informing farmers about where to sell their products.

More recently, mobile phone technology in developing nations has allowed urban dwellers without bank accounts to send money to relatives in rural villages, saving time as well as reducing financial costs and personal risk. Nowhere has the use of mobile phones for money transfer become more ubiquitous than in Kenya. The rapid rise of M-PESA, the country's most widely used mobile payment system, has garnered the attention of policy makers and private enterprise alike. In just six years, M-PESA has transformed how money flows throughout Kenya and similar systems are being deployed elsewhere on the continent of Africa and throughout the world.

The current study aims to investigate the impact of mobile payment adoption on the economic advancement of Kenyan and Tanzanian microentrepreneurs. The settings of Kenya and Tanzania were chosen in order to compare and contrast two nations with close cultural ties and yet different levels of mobile payment diffusion. Microentrepreneurs are prevalent throughout the developing world and are essential to the economic well-being of the communities they serve. Thus this work may afford enhanced understanding of the economic impact of mobile payments on the financial performance of microenterprises, which has implications on income growth and poverty reduction in these two nations and possibly throughout the developing world.

Admittedly, the study has some limitations, largely resulting from financial, time, and logistical constraints. This study focuses on a relatively small sample of microenterprises, primarily from the retail and service sectors. The microenterprises that were examined are located in Kenya's and Tanzania's large urban centers. Despite recent urbanization, Kenya and Tanzania remain largely rural societies. Mobile payment adoption factors associated with rural microenterprises, prominent in both nations, may differ from those of the urban setting. The economic impact of mobile payments on such microenterprises may also differ. Given the survey locales, the study is heavily biased towards formal microenterprises housed in permanent or semi-permanent structures with government licenses. However, it is clear that informal microenterprises are major employers in Kenya and Tanzania. Even though the study provides useful insight, the results may not provide a broad representation of mobile payment use among microentrepreneurs. Also, this work relies on respondents' self-reports of business income levels, mobile payment usage levels, and number of customers. Without further evidence to confirm these figures, they should be viewed as indicative. Finally, this study was conducted during the week leading up to Kenya's national elections. A number of the participants in Kenya noted that

their businesses had been negatively impacted by the uncertainty surrounding the elections. It is possible that the findings in Kenya, especially those related to income growth, were affected by the pre-election business environment. That said, this research is exploratory in nature with an eye towards future research that can be conducted for a wider scope of microenterprises.

Organization of the Thesis

Chapter 1 has introduced the topic, providing a context for the study. Also, research goals are outlined and the study's limitations are introduced.

The remainder of the thesis is organized as follows. Chapter 2 examines the literature. Starting by defining the developing economies' context, the chapter explains the base of the pyramid (BoP) business perspective and highlights the countries of interest – Kenya and Tanzania. For each country, key demographic and economic figures are provided along with a brief history and description of the current economic and political situations. The chapter also reviews literature pertaining to mobile telephony use in developing economies, mobile payments, and the role of microenterprises in economic development. The theoretical framework for the research is introduced along with the research questions, hypotheses, and research model.

Chapter 3 addresses the study's methodology. The research design, study location, and sampling methods are presented.

Chapter 4 comprises the data and analysis. In this chapter, descriptive statistics are presented and discussed. Analyses using analysis of variance (ANOVA) are conducted to test the hypotheses. Using linear regression analysis, the research model is tested and refined. Key observations linking the data to the literature are developed.

Chapter 5 concludes the thesis, providing a summary of the findings along with recommendations for future research and implications for research and practice.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Defining Developing Economies

Before moving forward, it may be useful to define the term "developing economy." In 2011, the United Nations' Committee for Development Policy defined the term "least developed countries (LDCs)" as "low-income countries suffering from the most severe structural impediments to sustainable development." (United Nations, 2011) Sustainable development incorporates economic, social, and environmental aspects. At present, to be classified as an LDC, a country must have fewer than 75 million inhabitants and meet threshold levels based on the following criteria: gross national income (GNI) per capita, Human Assets Index, and Economic Vulnerability Index. (United Nations, 2011) As of 2012, 130 countries meet these criteria.

As for the World Bank, its main criterion for classifying economies is GNI per capita. All 188 member countries are classified as either low income, middle income (subdivided into lower middle and upper middle), or high income. The low-income and middle-income economies are sometimes referred to as developing economies. Based on 2011 GNI per capita data, the income groups are divided as follows: low income, US$1,025 or less; lower middle income, US$1,026 - US$4,035; upper middle income, US$4,036 - US$12,475; and high income, US$12,476 or more. (World Bank, 2012a) The World Bank thus considers 144 nations to be low-income or middle-income economies, or developing economies. It should be noted that the terms "developing nation" and "developing economy" will be used synonymously throughout this report and will refer to those nations categorized as developing economies (low income or middle income) by the World Bank. Similarly, the terms "developed nation" and "developed economy" will be used synonymously throughout this report and will refer to those nations categorized as high income by the World Bank.

In addition to dividing economies according to GNI per capita income group, the World Bank classifies developing economies by geographic region. Table 1 highlights these classifications.

Table 1: Developing Economies' Geographic Regions

Geographic Region	Total Number of Countries	Number of Countries Considered Developing Economies
East Asia and Pacific	37	24
Europe and Central Asia	57	23
Latin America and the Caribbean	41	29
Middle East and North Africa	21	13
South Asia	8	8
Sub-Saharan Africa	48	47
World (includes North America)	215	144

The World Bank defines the international poverty line for extreme poverty as an average daily consumption of US$1.25 at 2005 prices. This figure is based on the average of national poverty lines in 10 to 20 of the world's lowest economies. For all developing economies, US$2 per day is used as the median poverty line. In 2008, 1.29 billion people consumed US$1.25 per day and 2.47 billion people consumed US$2 per day. (World Bank, 2012g; World Bank, 2012h)

Geographic Distribution of Developing Economies

The World Bank's most recent poverty estimates indicate that between 2005 and 2008, the number of people living in extreme poverty fell in all six developing country regions. Overall, the number of people living in extreme poverty fell from 43.1 percent in 1990 to 22.2 percent in 2008. Despite these advances in the developing world, poverty remains widespread throughout South Asia and sub-Saharan Africa. In 2008, South Asia recorded the world's highest number of people living in extreme poverty – 571 million. Nevertheless, this figure represents an improvement over the peak of 641 million in 2002. (World Bank, 2012h) Sub-Saharan Africa

shows yet a different story. While poverty has declined in sub-Saharan Africa (by 4.8 percentage points since 1990), the number of people living in extreme poverty actually increased from 290 million in 1990 to 356 million in 2008.

High birth rates and youthful populations have resulted in population growth outpacing poverty reduction in this area of the world. In fact, according to the World Bank's current World Development Indicators, one-third of the world's poorest people reside in sub-Saharan Africa. Of the 144 nations classified as developing economies by the World Bank, 47 of these nations are located in sub-Saharan Africa. (World Bank, n.d.) Also, 33 of the 49 countries considered as LDCs by the United Nations (UN) are located in sub-Saharan Africa. (United Nations, 2009)

Even so, Africa has witnessed significant economic growth during the first decade of the millennium. In 2008, the continent's collective gross domestic product (GDP) rose to US$1.6 trillion, making it comparable to the GDPs of Russia and Brazil. Given its natural resources, youthful workforce, and improving political and macroeconomic stability, McKinsey Global Institute has pegged Africa as one of the world's most rapidly growing economic regions. (Roxburgh et al., 2010) Long-term economic growth and stability, however, will hinge in part on the ability of African countries to translate economic growth into poverty reduction among their populations.

McKinsey Global Institute categorizes African countries into four broad clusters: diversified economies, oil exporters, pre-transition economies, and transition economies. Diversified economies have the most significant manufacturing and service industries. In these economies, the construction, banking, communications, and retailing industries account for 70 percent of GDP growth. The oil exporters have the highest GDP per capita and have benefited from growing revenues as oil prices have increased. Pre-transition economies, though growing

rapidly, have an average annual GDP per capita of US$353. They also lack stable governments, adequate macroeconomic conditions, and sustainable agricultural development. The transition economies are of particular interest. Although they have lower GDP per capita than diversified economies and oil exporters, they have rapidly growing economies. With improved infrastructure and regulatory systems, these countries could compete with other low-cost emerging economies. Two transition economies worth mentioning are Kenya and Tanzania, which both have significant opportunities for growth in the domestic service sectors (banking, communications, and formal retail). In addition, they have significant amounts of uncultivated cropland. (Roxburgh et al., 2010) The economies of these countries are explored further in a subsequent section of this review.

Table 2: African Country Categories – McKinsey Global Institute (Roxburgh et al., 2010)

Diversified Economies	Oil Exporters	Pre-transition Economies	Transition Economies
Egypt	Algeria	Congo, D. R.	Cameroon
Morocco	Angola	Ethiopia	Cote d'Ivoire
Namibia	Chad	Mali	Ghana
South Africa	Congo, Rep.	Sierra Leone	Kenya
Tunisia	Equatorial Guinea		Mozambique
	Gabon		Senegal
	Libya		Tanzania
	Nigeria		Uganda
			Zambia

Base of the Pyramid Perspective

One of the most daunting challenges of the twenty-first century is the inclusion of earth's poorest individuals into an increasingly globalized economy. Paul Collier describes these individuals, who have a combined population of roughly one billion people and live within 60 low-income countries, as the "bottom billion." He goes on to assert that these countries have largely missed out on the global economic growth opportunities of the twentieth century and

that, as such, they have diverged from the rest of mankind. (Collier, 2008) Collier stresses the importance of the bottom billion's societies and governments working towards development internally. He also calls for the international community, including high-income and middle-income countries, to reinforce these internal processes and enhance these opportunities for prosperity through trade, security, and governance policies. (Collier, 2008)

Similar to the notion of the bottom billion, the base (or bottom) of the pyramid (BoP) is another perspective on poverty alleviation, first articulated by C.K. Prahalad and Stuart Hart. BoP describes the nearly four billion people with per capita incomes below US$1,500 (purchasing power parity). Prahalad and Hart depict the BoP as a growth opportunity for multinational corporations, requiring radical innovations in technology and business models that could ultimately lift billions of individuals out of poverty. This opportunity is based on profits derived from high volume and capital efficiency as well as gains through mutual learning. Prahalad and Hart believe that multinational corporations have the technological, managerial, and financial resources to make necessary changes in technology, credit, cost, and distribution in order to benefit from this opportunity. (Prahalad & Hart, 2002) Overall, the BoP strategy relies on the idea that businesses can provide both public and private value. (London, 2008)

The first steps toward corporate BoP strategies have centered on affordable reformulated and repackaged products, extended local distribution, and partnerships with non-governmental organizations. (Simanis & Hart, 2008) However, some, like Karnani (2006), have criticized BoP business models for simply viewing the poor as consumers. He argues that the best means of reducing poverty is investment in improving the skills and productivity of the poor and in creating more employment opportunities for them. As such, both government and private firms have key roles to play. (Karnani, 2006)

Simanis and Hart (2008) also criticize "the single serving" BoP business model for having a narrow consumption-based understanding of the poor. They now call for a "second-generation" of BoP strategies that incorporate processes of co-invention and business co-creation to foster true partnerships between corporations and BoP communities. (Simanis & Hart, 2008) This second iteration of BoP strategies has implications for poverty alleviation. BoP ventures are expected to generate economic and societal returns for both the investing enterprise and local community through shared commitment and learning. The current study aims to add to the bottom billion and BoP perspectives by enabling better understanding of some of the needs of microentrepreneurs and the contributions that they make to their communities. Such information may be relevant and useful to policy makers and private enterprises engaged in or looking to engage in BoP ventures.

Overview of Kenya

Located on Africa's east coast and straddling the equator, Kenya is often referred to as "the cradle of humanity" since some of the earliest evidence of man's ancestors was discovered in its Great Rift Valley. (BBC News, 2012b) After gaining independence in 1963, the country was led by liberation struggle leader, Jomo Kenyatta, until his death. Kenyatta was succeeded by Daniel arap Moi, who remained in power until December 2002. Throughout this time, Kenya was viewed by many as an African success story in terms of its economy and development until the widespread political unrest that followed the 2007 presidential elections. The country has since maintained stability, following the formation of a coalition government in 2008. (Central Intelligence Agency, 2013a)

As of July 2012, Kenya's population was estimated at 43,013,341 inhabitants, growing at a rate of 2.44 percent. Kenya is an ethnically diverse country with over 40 ethnic groups including: Kikuyu (22 percent), Luhya (14 percent), Luo (13 percent), Kalenjin (12 percent),

Kamba (11 percent), Kisii (6 percent), Meru (6 percent), other African (15 percent), and non-African (1 percent). (Central Intelligence Agency, 2013a) Eighty-eight percent of its population resides in rural areas. Nonetheless, the annual rate of urbanization is projected to reach 4.2 percent over the period of 2010 to 2015 and the World Bank estimates that half of Kenya's population will live in cities by 2050. (World Bank, 2012d) A significant portion of Kenya's urbanized population lives in the capital city of Nairobi, which has an estimated 3.375 million people.

The country's total population has a literacy rate of 87.4 percent (male – 90.6 percent; female – 84.2 percent) and the average school life expectancy (the total number of years of schooling a child can expect to receive) is eleven years. (Central Intelligence Agency, 2013a) In 2003, free universal primary education was introduced. Over eight million children attended primary school in 2007, compared with 5.9 million in 2000. This program was also critical to Kenya's achievement of gender parity in primary education. (African Development Bank Group, 2008) Nevertheless, according to the Gender Inequality Index (GII), which reflects gender-based inequalities related to reproductive health, empowerment, and economic activity, Kenya's value of 0.627 ranks it at 130 out of 146. (United Nations Development Programme, 2011)

The Human Development Index (HDI) assesses long term progress in human development with respect to long and healthy life, access to knowledge, and a decent standard of living. Kenya's HDI for 2011 was 0.509, placing it in the low human development category. Kenya's HDI value, however, is above average for sub-Saharan African countries and its value has increased 21 percent since 1980. (United Nations Development Programme, 2011) The 2005-2006 Kenya Integrated Household Budget Survey (KIHBS) indicates that national absolute poverty has decreased. In total, poverty dropped from 51 percent in 1997 to 46.1 percent in

2005-2006. Rural poverty decreased from 53 percent to 49 percent and urban poverty decreased from 49.2 percent to 34 percent, over the same period. (World Bank, 2012d) In 2003, only 16 percent of households had access to electricity, 41 percent of households had access to improved drinking water source, and 19 percent had access to improved sanitation. (World Bank, 2012d) According to the Kenya Demographic Health Survey report of 2008-2009, Kenya's households gained greater access to a number of these services: electricity – 23 percent of households, improved drinking water source – 47 percent of households, and improved sanitation – 33 percent of households. Moreover, according to a number of reports, Kenya's middle class is expanding. (Kiberenge, 2012; African Development Bank Group, 2008; Ncube & Shimeles, 2012) The Kenyan middle class is having smaller families, living in up-market estates, and enrolling children in private school. (Kiberenge, 2012)

Despite the aforementioned gains, wide regional disparities persist and poverty remains a critical development challenge. In 2008, the African Development Bank Group noted that 10 percent of households own roughly 36 percent of Kenya's total wealth and that poverty and inequality are marked in rural areas. To combat some of the poverty-related issues, the Kenyan government increased the budget for orphans and vulnerable children, increased allocations for funding to the elderly, and invested KSh1 billion (approximately US$11.9 million) to a food subsidy program. (African Development Bank Group, 2012a)

During the 2000s, most of Africa achieved strong economic growth rates. As a result of this recent momentum, known as the African Renaissance, 22 African economies have achieved per capita incomes above US$1,000, the World Bank middle-income threshold. With a per capita income of approximately US$800, Kenya has lagged behind. Given its position as a financial and transportation hub for East Africa and beyond, strong human resources, and energetic private

sector, Kenya, nonetheless, has the potential to reach middle income status and to become one of Africa's best performing economies. (World Bank, 2012f) Kenya's ability to improve its economic position currently hinges, in large part, on the government's ability to maintain political and economic stability.

Kenya's post-election violence in 2007 and 2008 was wrought with inter-ethnic clashes, leading to over 1,000 deaths and the internal displacement of over 100,000 individuals. (New York Times, 2012; African Development Bank Group, 2012a) As tensions settled, a coalition government was formed, bringing together former presidential rivals Mwai Kibaki and Raila Odinga. In the power-sharing agreement, Mr. Kibaki served as president, Mr. Odinga as prime minister. (New York Times, 2012) Since then, significant reforms have taken place, including the adoption of a new Constitution in 2010, which limits presidential powers, establishes new institutions of governance, and gives Kenyans a bill of rights. (World Bank, 2012f; New York Times, 2012) The passing of the Constitution in referendum and the creation of the Independent Electoral and Boundary Commission (IEBC) appear to have helped ensure the relatively peaceful elections that took place in February 2013.

In 2011 and 2012, Kenya experienced relatively sluggish GDP growth, with rates reaching 4.4 percent and 4.3 percent, respectively. During the same period, sub-Saharan Africa as a whole, with the exception of South Africa, experienced a growth rate of more than five percent. Kenya's GDP growth rate also lagged behind those of its East African neighbors such as Ethiopia (7.5 percent – 2011, 7.0 percent - 2012) and Tanzania (6.4 percent – 2011, 6.5 percent - 2012). (International Monetary Fund, 2012) Kenya's slow growth rate in 2012 has been primarily attributed to measures taken by the Central Bank of Kenya (CBK). In early 2012, the CBK increased interest rates in an effort to contain inflationary pressure, as inflation had reached

20 percent by the end of 2011. As of October 2012, inflation had decreased to 4.1 percent. With the CBK's actions achieving its intended monetary objective, it has begun to ease its monetary policy to stimulate economic growth. As such, the World Bank's most recent estimates project that Kenya's economy will grow by 5.0 percent in 2013.

Kenya's economic growth will also be influenced by how well its economy adapts to the country's changing employment landscape. The demographic composition of the nation is changing as death and birth rates fall and adults live longer. The result has been a marked increase in the share of the population between 15 and 64 years of age (55 percent – 2012; 47 percent – 1990). (World Bank, 2012f) Currently, 2 out of 3 Kenyans live in the countryside, making Kenya a largely rural country. However, over the last 20 years, Kenyans have progressively migrated to urbanized areas, moving away from family farming towards wage jobs or self-employment outside of agriculture. Whereas farming accounted for 40 percent of Kenya's GDP at independence, in 2012 it decreased to 25 percent. By contrast, the service sector has seen a substantial increase, particularly in non-agricultural self-employment. The confluence of Kenya's demographic transition and structural transformation has provided Kenya with an opportunity for economic growth through diversification.

Kenya's 2009 census data indicates that 14.3 million Kenyans are employed, with 6.5 million in family farming, 5.1 million in wage jobs, and 2.7 million in non-farm self-employment. These figures show that self-employment , most of which are considered to be microenterprises, and wage jobs have overtaken family farming as Kenya's predominant sources of employment. Two million of those with wage jobs were considered to hold high productivity, "modern sector" jobs. (World Bank, 2012f) The World Bank notes that the creation of such high productivity wage jobs is critical to Kenya achieving substantial growth in incomes and a

reduction in poverty over the long term. (World Bank, 2012f) However, according to economic survey figures, modern sector wage jobs increase by 50,000 per year, while the working age population grows by 800,000 per year, prompting fierce competition. Thirty-four percent of Kenya's population falls between the ages of 15 and 34. (African Development Bank Group, 2012a) According to the KIHBS of 2005-2006, this group accounts for roughly 70 percent of total unemployment in Kenya. Specifically, for individuals aged 15 to 19, unemployment was estimated at 25 percent; unemployment was 24.2 percent for 20–24-year-olds; it was 15.7 percent for those 25 to 29 years of age; and it was 7.5 percent for the age group 30-34. (African Development Bank Group, 2012a) As young Kenyans migrate to urban centers, youth unemployment is a growing problem.

Long-term income growth and poverty reduction will rely on the expansion of high productivity wage employment in Kenya as has been the case in countries like Brazil, China, South Korea, and Vietnam. (World Bank, 2012f) An additional imperative for sustained income growth and poverty reduction is a well-trained labor force. To that end, a commitment to boosting education completion rates as well as improving the quality and relevance of education is vital.

The informal sector, consisting of both non-farm self-employment and wage jobs, remains a major employer in Kenya. Consequently, microenterprises play a key role in job creation in Kenya. (African Development Bank Group, 2012a) Improving incomes of non-farm self-employment must be addressed in the medium term. In addition to lacking fixed space and facing legal marginalization, microenterprises encounter financing constraints and lack of skill, including business skills such as bookkeeping and market research. Public policy and business

sector solutions that boost the welfare of microenterprises are likely to have an overall positive effect on income growth and poverty reduction in Kenya.

Overview of Tanzania

After attaining independence from British colonial rule, Tanganyika and the island of Zanzibar united in 1964 to form the United Republic of Tanzania. Julius Nyerere served as its first president. He remained in office until his resignation in 1985 and was succeeded by Ali Hassan Mwinyi. Tanzania held its first democratic elections in 1995, putting an end to one-party rule. Its current leader is President Jakaya Kikwete, who has been in office since 2005 and is now serving his second term. He is Tanzania's fourth democratically elected president and, under his leadership, Tanzania's economy has grown while its foreign debt has been eliminated. (BBC News, 2012a)

Tanzania's population currently stands at 46,912,768 and is growing at a rate of 2.85 percent. (Central Intelligence Agency, 2013b) Tanzania is generally characterized as being politically stable and free of the ethnic cleavages common within the populations of its East African neighbors. (African Development Bank Group, 2011) The Tanzanian population is 99 percent African of which 95 percent is Bantu, consisting of over 130 tribes; the remaining one percent consists of Asian, European, and Arab ethnicities. On the island of Zanzibar, the population is described as being Arab, African, and mixed Arab and African. (Central Intelligence Agency, 2013b)

Tanzania has a literacy rate of 69.4 percent (male – 77.5 percent; female – 62.2 percent) and the average school life expectancy is nine years. Given its high illiteracy rate, education reform has been implemented to improve the provision of basic education. As a result, net primary school enrollment rose from 59 percent in 2000 to 95.4 percent in 2010. The 2007-2008 indicator survey, showed a reduction in the prevalence of HIV among the 15 to 49 age group

from 10 percent in the late 1990s to 5.7 percent. According to the 2010 Global Gender Gap Report, Tanzania's Gender Development Index of 0.68 ranks it as a country with a moderately high male/female gender disparity. (African Development Bank Group, 2011)

Seventy-four percent of Tanzania's population lives in rural areas, though the country's annual urbanization rate is 4.7 percent. (World Bank, 2012e) While Tanzania's HDI value improved slightly from 0.370 in 2005 to 0.398 in 2010, poverty is prevalent. Rural households account for nearly 80 percent of the country's poor. Poverty has stagnated in these areas due to low agricultural growth and lack of agricultural equipment and productivity. The poverty level in rural areas can reach as high as 37 percent. (African Development Bank Group, 2011) The government's national MKUKUTA II agenda (a national framework for accelerating economic growth, fighting poverty, and achieving Tanzania's Millennium Development Goals (MDGs)) was designed to focus on reducing poverty, urban and rural, by promoting inclusive, sustainable, employment-enhancing economic growth, creating productive job opportunities for women, youth, and people with disabilities, and improving food security. (African Development Bank Group, 2012b; Ministry of Finance and Economic Affairs United Republic of Tanzania, 2010)

Over the past 12 years, Tanzania has experienced strong GDP growth, averaging nearly 7 percent annually and outpacing sub-Saharan Africa as a whole. (World Bank, 2012b) Tanzania showed considerable resilience to the global financial crisis from 2008 to 2009. The country's economic stability during this time of economic volatility may be attributed to rapid and constant population growth, fueling aggregate demand, a high level of political stability, and the relative isolation of the Tanzanian economy, protecting it from external economic shocks. (World Bank, 2012c)

The Tanzanian government's stimulus package, initially implemented in 2009, was another factor that bolstered the country's resilience to the global financial crisis. This policy contributed to economic growth, resulting in increased public expenditures and aggregate demand. Though the stimulus package was intended to temporarily stem the effects of global economic conditions, fiscal stimulus packages were implemented throughout 2010 and the first half of 2011, subsequently deteriorating the country's fiscal balance. The surge in public expenditures and decline in aid inflows over the period of 2009 to 2011 caused the Tanzanian government to turn to financial markets for financing for the first time since the early 2000s. (World Bank, 2012b)

Even though the fiscal deficit in 2012 declined for the first time since 2008, reduced public spending has dampened Tanzania's economic growth somewhat. (World Bank, 2012c) Growth has also been hindered by lack of adequate energy infrastructure and fuel shortages. Demand for electricity exceeds supply by about 28 percent and interruptions to the electricity supply continue to be a critical concern for businesses. (African Development Bank, 2012b; World Bank, 2012b) Currently, only 13 percent of the population has access to electricity, posing substantial impediments to private sector growth.

Consistent with its performance over the last decade, Tanzania's GDP is forecasted to expand approximately 6.5 to 7 percent over the next few years. (World Bank, 2012c) Growth has been buoyed by exports as demand for gold in world markets has increased. Recent discoveries in the mining and oil and gas sectors have prompted capital inflows, such as the US$3 billion coal and iron ore mining project signed by Sichuan Hongda Co. Ltd. of China. Other important factors driving Tanzania's economic performance is growth in service sectors, industry and construction, and agriculture, hunting and forestry. Subsectors within these broad sectors

primarily responsible for growth include the construction subsector (projected 2013 growth – 9.8 percent) driven by the construction of residential and non-residential buildings, roads and bridges; the communications subsector (projected 2013 growth – 19 percent) driven by increased mobile services use; and the financial intermediation subsector (projected 2013 growth – 10 percent) driven by an increase in the levels of deposits and lending by commercial banks. (African Development Bank Group, 2012b)

Despite Tanzania's significant economic growth, the positive impacts have not been felt by the poorest members of Tanzanian society. The country's poverty rate has stagnated at 30 percent for more than a decade. (World Bank, 2012b) This may be explained by a few factors. When Tanzania's GDP expansion is coupled with its rapid population growth, its GDP per capita growth rate stands at 3.5 percent. (World Bank, 2012c) While expansions in communications and financial intermediation subsectors have spurred economic growth, these capital intensive sectors have contributed little to employment creation. These sectors employ less than one percent of the Tanzanian workforce. Also, Tanzania remains a largely rural country with 75 percent of the population living in rural areas and the agriculture sector continues to be an important employer. Currently, two of the slowest growing sectors, agriculture and manufacturing, account for 80 percent of formal and informal employment. Additionally, government investments in health and education, necessary to improve human capital stock, are expected to take a generation to translate into productivity gains. (World Bank, 2012c)

Tanzania, like most developing nations, is experiencing a large influx of its population from rural areas to urban settings. Living in an urban center in Tanzania gives one greater access to healthcare facilities, electricity, financial services, and education. Yet, the key motivation for migration to urban centers is the search for higher incomes. Although migrants to urban areas are

more likely to be employed in wage employment than those in rural areas and those already living in urban areas, urban unemployment has risen in recent years. (World Bank, 2012c) Even as overall youth unemployment rates have remained stable at just under 9 percent from 2000 to 2006, the urban/rural disparities are striking. In 2006, the urban youth unemployment rate was 24.4 percent and the rural youth unemployment rate was 3.2 percent. (African Development Bank, 2012b; World Bank, 2012b) Nevertheless, non-agricultural microenterprises have increasingly served as a source of job creation. Specifically, the number of microenterprise jobs rose by 13 percent in Tanzania from 2000 to 2006. (World Bank, 2012b) Tanzania's urbanization may be aided by policies that facilitate microenterprise access to credit, information, technology, and markets.

Mobile Telephony Use in Developing Economies

The World Bank's most recent *Information and Communications for Development* report notes that there are roughly 6 billion mobile subscriptions in use worldwide, representing nearly 75 percent of the world's population. Mobile communications have evolved from voice communication services and text messaging to more sophisticated offerings such as e-mail access and Web browsing, file downloads, and streaming media thanks to "smart" mobile phones, or smartphones. The breadth of mobile telephone service affords the use of applications traditionally only available on Internet-connected personal computers (news, stocks, games, calendars, alerts, etc.). (Chircu & Mahajan, 2009) With an emphasis on such state-of-the-art solutions, subscribers in developed economies utilize mobile telephony as a complement to fixed lines and personal computers. (Qiang, 2009; Chircu & Mahajan, 2009)

However, with 86 percent of the world's population living in developing nations, there are more mobile phones in developing nations than in developed nations. (Chircu & Mahajan, 2009) In fact, low- and middle-income countries' mobile subscriptions have increased by over

1,500 percent between 2000 and 2010, leading to increased levels of access. (World Bank, 2012a) The reasons for the success of mobile phone technology in developing nations are varied. First, the infrastructure costs associated with mobile phone technology are relatively lower than those associated with landline telephony. Landline telephony requires the deployment of an extensive network of wires into every community and eventually into every household. These costs can become prohibitively high in developing nations. Alternatively, mobile phone technology can be deployed using a network of base stations, which provides coverage miles away. (Aker & Mbiti, 2009) Moreover, mobile phone technology offers consumers with more attractive bundles of price, quality, and services. (Rouvinen, 2004) As such, in areas with low levels of infrastructure and financial resources, mobile telephony has leapfrogged landline telephony.

When examining the growth of mobile phone technology in developing economies, it must be noted that mobile phone use in developing economies differs from that in developed economies. For instance, in developing economies, mobile phones are primarily used for voice communications and increasingly for short messaging services (SMS). Another key difference in mobile phone use lies in the consumption patterns. The standard consumption pattern in developed nations is one user per handset. However, due to the scarcity of resources in developing economies, often many family members share the same handset, each using a different subscriber identity module (SIM) card. Thus developing nations have yet to realize the full potential of mobile telephony. (Peres, Muller, & Mahajan, 2010; Meso, Musa, & Mbarika, 2005)

Mobile Telephony Use in Sub-Saharan Africa

Africa is the continent with the highest ratio of mobile phone to total telephone subscribers on earth. (Molony, 2006) In 2011, there were over 620 million mobile connections

on the continent and this figure was forecasted to reach 735 million by the end of 2012. (Phillips, Lyons, Page, Viviez, & Molina, 2011) Despite having fewer than three landlines available per 100 people, there are ten times as many mobile phones as landlines in sub-Saharan Africa. (International Telecommunication Union, 2009; Aker & Mbiti, 2010; GSMA, 2012) In fact, in many sub-Saharan African nations such as Nigeria, Angola, Kenya, Senegal, and Ghana, the ratio of total mobile connections to total population is higher than 50 percent. In spite of these advances, penetration rates are still considerably lower in Africa than in other regions of the world. Nevertheless, when it comes to the spread and potential impact of mobile telephony within developing economies, sub-Saharan Africa is of particular interest.

Mobile Telephony Use and Economic Development

In recent years, there has been much discussion regarding the role of mobile telephony as a transformative tool for economic development. (Economist, 2009) Aker (2010) conducted a study of grain markets in Niger between 2001 and 2006 during the country's phase-in of mobile phone service. The work provided empirical evidence that associated a 10 to 16 percent reduction in price dispersion with the introduction of mobile phone coverage. Aker (2010) found that mobile telephones reduced marginal search costs of the grain traders by allowing them to obtain market information over a number of markets more quickly. These reduced search costs, thereby resulted in reduced inter-market price dispersion. Such market-level outcomes have implications for improved trader and consumer welfare. (Aker, 2010)

In their case study analysis of supply chains within the Nigerian cloth-making industry, Jagun, Heeks, and Whalley (2008) found evidence of mobile telephones reducing delays, financial risk, and personal risk. In this case, mobile telephone calls often substituted for journeys. Weavers could phone ahead to determine the status of new orders and intermediaries were able to assess the availability of raw materials. Mobile phones reduced not only the

physical risk associated with the journeys, but also the risk of time and money spent on unproductive journeys. (Jagun et al., 2008)

Also, small businesses within developing economies tend to have smaller networks of reliable business contacts. These smaller networks often limit the range and quantity of information available. By reducing information uncertainty, mobile phones may broaden the business networks of small businesses, providing opportunities for business growth and development. (Duncombe & Heeks, 1999)

Mobile Telephony for Financial Service Access

As mobile phone technology in developing economies has witnessed unprecedented growth, many of these new mobile users have begun to rely on mobile devices to execute monetary transactions. Initially, users in developing economies created innovative ways of using mobile phones to effectively transfer money across wide distances via informal airtime bartering schemes. Users purchased prepaid mobile phone credit that could be transferred to other users. The recipient could then sell the phone credit to a local broker in exchange for cash. (Jack & Suri, 2011) Other examples include more formal long-distance remittances and micropayments. These activities, which may be termed mobile payments (m-payments), enable users in the developing world to store value in an account accessible via the handset, convert cash in and out of a stored value account, and transfer between stored accounts. (Donner & Tellez, 2009) Donner and Tellez (2009) suggest that the active use of mobile payments in the developing world may lead to cost savings due to reduced transactions costs, increased savings rate, increased incomes, resilience to financial shock, and the reinvestment of money that is not currently in effective circulation. As such, numerous initiatives have been devised to utilize mobile phone technology to provide financial services to the "unbanked," or individuals with little or no access to basic financial services. (Donner & Tellez, 2009)

Mobile Payments

Mobile financial services including mobile payments, mobile banking, mobile finance, and mobile transfer, describe a set of applications that provide a platform for delivering financial services via mobile phones. Two of the most common platforms are mobile banking and mobile payments. Mobile banking typically refers to the access of banking services via mobile phone by customers of financial institutions. Alternatively, mobile payment pertains to any transaction paid for using a mobile phone. (Boyd & Jacob, 2007) Porteous (2006) distinguishes between two different approaches to mobile banking/mobile payments: additive approaches and transformational approaches. Whereas additive approaches target existing banked customers with the mobile channel serving as an additional channel, transformational approaches seek to meet the needs of unbanked groups. (Porteous, 2006)

Moreover, this "mobile money" network lies at the intersection of finance and telecommunications, embracing a number of stakeholders: mobile network operators, financial institutions, and regulators along with supporting businesses, air time agents, telecom retailers, and users. (Merritt, 2010) The success of the mobile money network calls for careful collaboration between this diverse set of players. A sustainable network also necessitates sufficient demand from consumers and firms. Like many ICT products, mobile payments exhibit network effects, the phenomenon in which the value of a product to its users depends on the total number of users. Accordingly, the value of a mobile payment system increases as more active users enter the network. Achieving a critical mass of users is necessary for the long-term viability of mobile payment systems. Thus difficulties in attracting early adopters can limit the systems' growth and utility. (Mas & Radcliffe, 2010)

There are currently over 100 mobile payment deployments around the world, reaching over 40 million users. (U.S. Agency for International Development & Citi Group, 2012; Donovan, 2011) Over half of these deployments have been in Africa. To date, only a few of these systems have reached economies of scale, with Kenya's M-PESA standing as the most well-known system. According to Omwansa and Sullivan (2012), prior to the launch of M-PESA, there were three key players in the mobile money landscape: Smart Money in the Philippines, True Money in Thailand, and MTN Banking in South Africa. The Philippines has been described as one of the most successful money markets in the world and one of the earliest mobile payments, Smart Money, was launched there in 2001. (Leishman, 2009) The system, introduced by the telecommunications provider Smart Communication in partnership with Banco do Oro, allows subscribers to text funds to other Smart Money subscribers, including individuals and food outlets. In Thailand, True Money was established as a mobile payment system by True Move, a mobile operator in Thailand. MTN Mobile Money was introduced in South Africa in 2005 through a joint venture between the telecommunications provider MTN Communications and Standard Bank. Standard Bank customers could use their mobile devices to transfer money and interact with the bank. (Omwansa & Sullivan, 2012) Other earlier movers in Africa were Celpay Holdings, which began offering mobile payment services in Zambia in 2002 and focuses on business to business payments, and Wizzit, which is an e-payment service started in South Africa in 2005. Wizzit allows customers to withdraw funds from any ATM branch using a Maestro branded debit card. (Porteous, 2006)

Since M-PESA's introduction and success, similar mobile payments have been introduced on the African continent. In 2011, Zimbabwe's largest telecommunications firm, Econet, introduced EcoCash, a mobile money transfer service. The service is linked with all of

Zimbabwe's commercial banks and is being accepted at an increasing number of businesses. (Clark, 2012) Last year, the FirstBank of Nigeria partnered with leading mobile network operator Etisalat to deliver Easywallet, a Nigerian mobile money service based on the SIM interface. (Clark, 2012) Other leading money transfer platforms in Kenya include Airtel's Airtel Money, Yu's yuCash, and Orange Money by France Telecom Group's Orange. (Mugwe, 2012)

Developed by Vodafone and launched in 2007 by its Kenyan affiliate Safaricom, M-PESA is a mobile phone-based electronic payment system that allows users to deposit, send, and withdraw funds. Once a user registers at an authorized M-PESA agent, an individual electronic money account linked to the user's phone number is assigned. The account is accessible through a SIM card-stored application, which allows for the deposit and withdrawal of cash from the user's account. In exchange for cash deposits, Safaricom issues "e-float", which is measured in the same units as money, to the user's account. The cash collected is deposited into Safaricom-held commercial bank accounts. (Jack & Suri, 2011) The user may also use the application to transfer funds to other subscribers, to pay bills, and to purchase mobile airtime credit. While registration is free, fees are levied when e-float is sent or when cash is withdrawn, according to a step function. Transfers to unregistered users incur higher fees. For P2P transfers, for example, it costs KSh33 (approximately US$0.39) to transfer from KSh501 up to KSh5,000 (approximately US$5.98 to US$59.72) to a registered M-PESA user. It costs KSh66 (approximately US$0.79) to transfer from KSh101 up to KSh2,500 (approximately US$1.21 to US$29.86) to an unregistered user. Withdrawals from an M-PESA agent, for instance, incur a fee of KSh10 (approximately US$0.12) for transactions ranging from KSh50 up to KSh100 (approximately US$0.60 to US$1.19). ATM withdrawals, which can only be made for sums of KSh200 (approximately

US$2.39) and higher, have a similar fee schedule. Table 3 summarizes M-PESA's current tariff scheme. (Safaricom, n.d.c)

Table 3: M-PESA Tariffs in Kenya Effective February 8, 2013 (Safaricom, n.d.c)

Transaction Range (KSh)		Transaction Type and Customer Charge (KSh)		
Min	**Max**	**Transfer to other M-PESA Users**	**Transfer to Unregistered Users**	**Withdrawal from M-PESA Agent**
10	49	3	N/A	N/A
50	100	5	N/A	10
101	500	27	66	27
501	1,000	33	66	27
1,001	1,500	33	66	27
1,501	2,500	33	66	27
2,501	3,500	33	88	49
3,501	5,000	33	105	66
5,001	7,500	55	143	82
7,501	10,000	55	171	110
10,001	15,000	55	220	159
15,001	20,000	55	237	176
20,001	25,000	82	275	187
25,001	30,000	82	275	187
30,001	35,000	82	275	187
35,001	40,000	82	N/A	275
40,001	45,000	82	N/A	275
45,001	50,000	110	N/A	275
50,001	70,000	110	N/A	330

(KSh83.72 = US$1.00, Yahoo! Finance, May 10, 2013)

M-PESA's tremendous success in Kenya may be attributed to several factors. First, the rapid uptake of M-PESA demonstrated a substantial need for financial services in the Kenyan marketplace. In 2007, there was a significant underrepresentation of financial services by formal financial institutions and only 18.9 percent of Kenyans were banked. Many Kenyans turned to "informal" instruments, such as rotating saving and credit associations (ROSCA), savings circles made up of friends, savings given to a family member or friend for safe-keeping, and savings hidden in a secret place, (35.2 percent) or "other formal" financial instruments (7.5 percent).

(Omwansa & Sullivan, 2012; Mbiti & Weil, 2011) Still a significant portion (38.4 percent) remained totally unbanked. (Omwansa & Sullivan, 2012) At the same time, Kenya is a country in which urban-rural remittances are common, given its high rates of poverty and the wage differentials between urban and rural areas. (Morawczynski, 2011) In 2006, 17 percent of Kenyan households relied on remittances as the primary source of income. (Mas & Radcliffe, 2010) Prior to the launch of M-PESA, the most common means of transferring money involved Kenya Post, informal bus companies, or delivering the funds to the receiver in person. (Mas & Radcliffe, 2010)

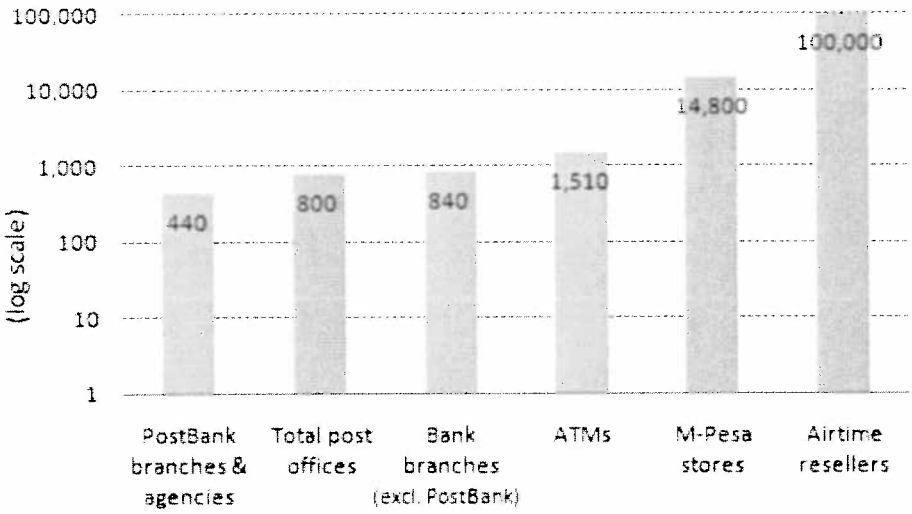
Furthermore, mobile phone penetration in recent years in Kenya has been such that much of Kenya's adult population has access to mobile telephony. In 2005, there were 4.5 million mobile phone subscribers in Kenya. The number of mobile phone subscribers has continued its rapid ascent, rising to 17.4 million in 2009 and to nearly 30 million by July 2012. With 24.6 million Kenyans above 15 years old, the current number of mobile phone subscribers is greater than the adult population. (Ondiege, 2010; World Bank, 2012d) Moreover, at the time of M-PESA's commercialization, the Kenyan telecommunications industry was dominated by Safaricom, which enjoyed a near 80 percent market share as well as access to a large network of airtime resellers. The value proposition of M-PESA to these airtime resellers was plausible. Commissions generated by the reseller on an M-PESA transaction would be in the vicinity of one to two percent, lower than the roughly five percent commissions generated on airtime sales. Safaricom was able to convince resellers that the volume of M-PESA transactions would outnumber airtime sales by a ratio of five-to-one or greater. (Mas & Radcliffe, 2010)

As Mas and Ng'weno (2010) note, when rolling out M-PESA, Safaricom benefited from branding, channel management, and pricing. The M-PESA brand was developed through heavy

investment in advertising and relied upon a simple value proposition that resonated with both urban and rural Kenyans – "send money home". The M-PESA brand was further supported by customer affinity and trust in Safaricom. Furthermore, the M-PESA interface and structure was simple and similar to that of airtime transfers. Channel management was facilitated by its two-tier structure consisting of individual stores and master agents that were responsible for liquidity management, selling M-PESA e-float to individual stores, and distributing agent commissions. (Mas & Ng'weno, 2010) Finally, the M-PESA tariffs were attractive to both customers and resellers.

The aforementioned factors have resulted in the unprecedented growth of M-PESA. M-PESA's 20 million users transferred US$500 million per month in 2011. (Jack & Suri, 2011; Donovan, 2011) This growth is noteworthy considering that M-PESA processes more transactions domestically than Western Union does globally. It is estimated that 40 percent of Kenya's adult population has access to M-PESA and that there are roughly five times as many M-PESA outlets in Kenya as there are post offices, bank branches, and ATMSs combined (Figure 1). Its ubiquitous presence, through a network of over 30,000 agents, has lowered transaction costs and afforded convenience for urban as well as rural populations. In Kenya, an amount equal to roughly 20 percent of the nation's GDP flows through M-PESA. (Omwansa & Sullivan, 2012)

Figure 1: Number of M-PESA Outlets (Mas & Ng'weno, 2012)



Given its tremendous success, services based on the M-PESA platform have been proposed. In 2010, M-KESHO was introduced by Safaricom and Equity Bank as a true mobile banking solution. In addition to allowing Equity Bank account holders to make transactions between their bank accounts and M-PESA accounts, the service offers non-account holders the opportunity to open a low-cost bank account. The M-KESHO accounts have no account opening fees, no monthly charges, and no minimum or maximum balances. Unlike M-PESA accounts, M-KESHO accounts pay interest and provide limited microcredit and insurance services. (Mas, 2010) Last year, Safaricom teamed up with Commercial Bank of Africa to offer M-Shwari, a credit and savings product for M-PESA customers. (McCarty, 2012) M-Shwari is similar to M-KESHO in some respects such as no account opening fees, no monthly charges, and no minimum account balance requirements. (Mas & Omwansa, 2012) Unlike M-KESHO, which relied on co-branding and the customer's relationship with Equity Bank, M-Shwari focuses on the customer's relationship with Safaricom. (Mbuvi, 2012) M-Shwari provides customers with annual interest rates of two to five percent on savings balances. Individual loans ranging from KSh100 to KSh20,000 (approximately US$1.19 to US$238.89) are offered on a one month basis

with a 7.5 percent service fee per month cycle. These services point towards further opportunities for financial inclusion using mobile money systems.

Of interest to businesses is Safaricom's Nunua na M-PESA, also known as the Buy Goods service. It allows for instant payments of goods and services from a merchant without an official relationship with the seller. Each participating business must apply to become an M-PESA Buy Goods partner by submitting an application to a registered M-PESA agent. Once the application has been processed, the merchant is issued a "Till Number" which is publicly displayed at the place of business. Using a mobile phone, the customer sends payment for the goods or services to the Till Number in lieu of the business telephone number. The Buy Goods transactions are made and processed at the time of purchase. Once the user initiates the transaction, it can only be reversed by the receiving merchant. (Safaricom, n.d.b) Nunua na M-PESA is primarily accepted at Kenyan supermarket chains Uchumi and Naivas and to a lesser degree small and medium-sized businesses. However, this service has not yet experienced rapid uptake and few businesses post a Till Number prominently on their store-front. (Safaricom, n.d.b; Mobile Kenya, 2011; Mas & Ng'weno, 2012) Safaricom also offers bulk payment services that enable organizations to send money by M-PESA for promotional payments, dividend payments, and salary disbursements. (Safaricom, n.d.a) Mas and Ng'weno (2012) listed the following as reasons for the limited adoption of these services among businesses: pricing and relatively small transactions, system delays and downtimes, payment confirmations, improperly identified transactions, and desire for paper receipts, among others.

M-PESA in Tanzania

In 2008, one year after its introduction in Kenya, M-PESA was launched in Tanzania by Vodacom Tanzania. Since traditional banking is even less common in Tanzania than it is in Kenya, the country presented a significant market opportunity for a financial service such as M-

PESA. (Camner & Sjöblom, 2009) While M-PESA had enjoyed rapid success in Kenya (2.7 million users and 3,000 agents 14 months after its introduction), the diffusion of M-PESA in Tanzania was markedly slower (280,000 users and 930 agents 14 months after its introduction). (International Finance Corporation, 2010)

There are a number of factors that may account for the slower rate of adoption of M-PESA in Tanzania. First, Tanzania's geographic size and population distribution are markedly different from those of Kenya. Tanzania is far more rural than Kenya; it also has a lower population density. As such, each Tanzanian M-PESA agent covered a larger geographic area and served a smaller base of customers, leading to reduced agent revenue. The Tanzanian population's financial access at the time of M-PESA's launch was also inferior to that of the Kenyan population. At the time, 54 percent of Tanzanians did not have access to any financial services. These factors, along with Tanzania's weaker economy (Kenya's GDP per capita – US$890; Tanzania's GDP per capita – US$520) and less developed banking system, made communicating M-PESA's value proposition to the Tanzanian market rather challenging. While M-PESA was first-to-market in Kenya, in Tanzania competing services such as Zantel's ZPesa and Zain's ZAP were introduced during the same time period, reducing the opportunity to build the brand loyalty that accompanies product introduction with significant lead time. (International Finance Corporation, 2010)

Another critical issue relates to market share; Safaricom's market share in Kenya in 2009 was 79 percent, whereas Vodacom held 45 percent of the Tanzanian market. Finally, as was previously noted, Safaricom was able to effectively leverage its existing network of airtime resellers to build its M-PESA network. In general, airtime resellers sell airtime to their partners, independent end retailers, who then sell to customers. Safaricom had 1,000 resell partners, many

of whom had multiple outlets. Three hundred of these resellers agreed to join the M-PESA network at its launch. Vodacom, on the other hand, had relationships with only six national airtime resellers, making it difficult for Vodacom's M-PESA to scale quickly and effectively enough to attract customers and agents. Table 4 highlights some of the key factors influencing the popularity of M-PESA in each country.

Table 4: Key Comparisons of Kenya and Tanzania (Camner and Sjöblom, 2009)

	Kenya	Tanzania
Geography/Demography		
Population	38.6 million	41.5 million
Size (km^2)	582,646	945,090
Population/km^2	66.2	43.9
Economy (GDP Per Capita)	US$890	US$520
Existing banking infrastructure		
Bank branches per 100,000 inhabitants	1.38	0.57
Population formally banked (as of 2006)	17%	8%
Other factors		
Mobile network operator market share (2009)	79% Safaricom	45% Vodacom
Ability to build an agent network	Prior to the launch of M-PESA, Safaricom had deals with 1,000 large dealers for airtime distribution.	Prior to the launch of M-PESA, Vodacom had deals with six large dealers for airtime distribution.
Marketing	Safaricom used the slogan "send money home," which resonated due to the popularity of domestic remittances.	Vodacom used the same advertisements in Tanzania as in Kenya. However, Tanzania's population is less educated and less financially literate than that of Kenya. Thus this marketing campaign had little resonance with Tanzanians.

More recent data points to improvements in M-PESA's performance in Tanzania. In September 2011, Vodacom Tanzania announced the activation of its 10 millionth customer.

(Vodacom Tanzania, 2011) It also reported the addition of 4 million new subscribers in 2011. (Wireless Federation, 2012) Despite its slow start, M-PESA is the most common mobile payment system in Tanzania. Though its development in Tanzania has not been as dramatic as it has been in Kenya, M-PESA use is picking up pace and there appears to be growing demand for the service. (Camner & Sjöblom, 2009)

Microenterprise Characteristics

Currently, there is no universally agreed-upon definition of the term "microenterprise". While definitions vary from country to country and from researcher to researcher, microenterprises are typically characterized by the number of hired workers. Mead and Liedholm (1998), Jagun et al. (2008), and the U.S. Agency for International Development describe microenterprises as enterprises with ten or fewer workers. (Nichter & Goldmar, 2005) Others in the development community, including Donner (2004), set the limit at five employees. Within this report, enterprises that employ up to ten people will be referred to as microenterprises.

The microenterprise sector is quite heterogeneous. Microentrepreneurs engage in economic activities that range from trade, retail, and manufacturing to the provision of services (tailors, caterers, mechanics, etc.). Microenterprises include sole proprietorships, part-time businesses, and household businesses and may operate in formal or informal sectors. Nonetheless, most microenterprises tend to be informal or semiformal entities.

Role of Microenterprises in Economic Development

Microenterprises account for 50 to 60 percent of all businesses worldwide (Economist, 2009) and make up the vast majority of non-agricultural enterprises in developing economies. (Donner & Escobari, 2010) In Africa, for instance, roughly 90 percent of all businesses are microenterprises. (Economist, 2009) Though such entities are ineffective in terms of volume throughput, their effectiveness in terms of increasing employment cannot be understated.

(Kirpalani & Gabrielsson, 2004) Particularly in developing economies, microenterprises provide a significant portion of income generation and employment, making them vital to livelihoods. (Jagun et al., 2008; Donner & Escobari, 2010) Half of all Indonesian workers are employed in microenterprises and in many Latin American countries, more than half of all employment is generated by microenterprises. (Nichter & Goldmark, 2005)

The ubiquity and flexibility of microenterprises have made them a focus of the development community as a potential path towards poverty alleviation (Ilavarasan & Levy, 2010). Duncombe and Heeks (2005) suggest that microenterprises, along with small and medium-scale enterprises, may contribute to poverty reduction in developing economies by expanding and providing more secure employment opportunities, securing greater economic opportunities for women, affording social benefits to the poor (enhancement of skills, increased self-confidence, empowerment, and security against income loss), improving income generation for the rural and extreme poor, and making markets work better for the poor. Not all microenterprises have the same potential for growth and poverty alleviation. Many microenterprises will remain small; they will, nevertheless, deliver benefits in terms of livelihood assets. (Duncombe and Heeks, 2005) Such microenterprises, termed "livelihood enterprises" by Duncombe and Heeks (2005), differ from "growth enterprises" which show a greater business focus and are generally poised for the long-term benefits of competitiveness, innovation, and exports. Recent focus on the impact of ICT, especially mobile telephony, on poverty reduction in developing economies highlights the need to better understand the use of such technology among microentrepreneurs.

Microenterprise Growth and Mobile Telephony

The popular press has shown recent interest in stories of microentrepreneurial creativity, productivity, and success as it pertains to mobile phone usage. Donner and Escobari (2010)

suggest that despite this recent attention, there is a dearth of studies concerning the use of mobile telephony within microenterprises in developing economies. Primary research studies pertaining to mobile phone use and microenterprises indicate that mobile phone usage improves microenterprise productivity mainly by amplifying and accelerating material and informational flows. (Donner & Escobari, 2010) Donner and Escobari (2010) found few studies indicating that mobile phone use leads to new businesses or an expansion of microenterprises' base of suppliers and customers. Thus with respect to mobile telephony and its impact on microenterprise growth, the question remains open. Some researchers have noted a causal relationship between access to ICTs, including mobile telephony, and business growth. (Chew et al., 2011; Ilavarasan & Levy, 2010) However, these causal relationships were found to be relatively weak and were based on studies that were limited in nature.

Three key informational challenges (absence, uncertainty, and asymmetry) face microenterprises in developing economies. Specifically, buyers/consumers often do not have enough information about appropriate prices or how suppliers/retailers differentiate their products. Suppliers, on the other hand, may encounter information uncertainties related to the existence and acceptance of new orders, the availability of raw materials, and the behavior of other actors within the supply chain. (Jagun et al., 2008) In terms of asymmetry, those seeking to trade often do so with individuals that have information they lack or are uncertain about. This is especially true with respect to ability and willingness to pay. In developing economies, the absence of a transaction history makes it difficult to assess creditworthiness. (Aryeetey, 2005; Hinson, 2011) Due to these challenges, the trading process typically has the following characteristics: trading tends to be slow; trading tends to be costly; and trading tends to be risky. The impact of these challenges constrains the development of business, commerce, and markets

in developing economies. (Jagun et al., 2008) Recent work has attempted to assess the impact of mobile telephony on such challenges faced by microenterprises. Based on her study of grain markets in Niger, Aker (2010) finds that the primary impact of mobile telephony is the reduction in search costs. In the Nigerian cloth-making industry, mobile phones improved the completeness of information and substituted for some journeys and in-person meetings, reducing the time and financial cost of information-gathering. (Jagun et al., 2008) In some instances, mobile phones have facilitated existing, trust-based relationships. (Molony, 2006) These studies point to the benefits of mobile telephony on existing businesses in accelerating and amplifying material and informational flows. (Donner & Escobari, 2010)

Chew et al. (2011) found that given the limited business use of ICT among their surveyed microentrepreneurs, mobile phone access alone did not necessarily produce business growth. They note that education, perceived usefulness of mobile phones, perceived empowerment, and business use of mobile phones are antecedents that predict total ICT access, as measured by ownership of mobile phones, personal computers, laptop computers, and availability of the Internet in the home and in the workplace. Their research indicates that greater ICT access is a driver of microenterprise growth. As such, Chew et al. (2011) concluded that the business use of mobile phones had an indirect, yet positive effect on business growth of the microenterprises they investigated in urban India. Ilavarasan and Levy (2010) found correlations between ICT access and business growth in their study of microenterprises in Mumbai. They caution that any causal relationship between business growth and ICT access should be considered only possible due to the cross-sectional nature of their study. (Ilavarasan & Levy, 2010)

Notwithstanding these studies, as Donner and Escobari (2010) suggest, the need remains for further quantification of the impacts of mobile telephony on specific subsectors of

microenterprises. Donner and Escobari also note that there has been even less work conducted to assess the impact of non-voice advanced mobile services, such as mobile banking, mobile payments, and mobile marketplaces, on microenterprises. These non-voice mobile services may have the potential to simplify supply chains and transform credit relationships in ways that voice-based mobile technology has been unable to so far.

Given the high rates of mobile phone adoption in the developing world and the potential positive impact that mobile payments could have on business transactions, it is important to find out whether there is a strong link between the business use of mobile payments and business growth. The purpose of the current study is to examine these relationships and to assess the potential impact of other factors that might positively or negatively influence the adoption of mobile payments and thus the efficacy of the business use of mobile payments on business growth.

Mobile Payment Use in Microenterprises

Mobile banking/mobile payment services offer a favorable value proposition to unbanked customers with respect to cost, reliability, safety, flexibility, and immediacy. Such benefits also extend themselves to microenterprises. Microenterprises, whose needs are not always well served by traditional banks, are expected to benefit substantially from mobile payments. Higgins, Kendall, and Lyon (2012) surveyed 865 owners of small and medium-sized enterprises in Kenya. They found that 67 percent used mobile payments for business dealings and that 80 percent used mobile payments once or twice a week. Such usage behavior is comparatively more intensive than that of consumers, who use mobile payments on average twice per month. In a similar study, Bångens and Söderberg (2011) interviewed 110 micro- and small enterprises in Tanzania about their use of mobile payments. Of the enterprises interviewed, 24 percent use mobile payments for business purposes. The key findings were that the impact of mobile payments was

largely seen in improved logistics and time saved. These studies highlight micro- and small enterprises' use of mobile payments to facilitate transactions. The convenience of mobile payments may afford microenterprises more time to support other business functions. As such, mobile payments may play a positive and important role in microenterprise business growth.

Technology Acceptance Model (TAM)

Despite the growing availability of mobile devices and related services, research suggests that users may not adopt these technologies. (Wang, Lin, & Luarn, 2006) To understand the impact of mobile phone technology on microenterprises, it is useful to understand the critical factors affecting technology adoption. One of the most robust and widely used theoretical frameworks in addressing users' acceptance or rejection of technology is the Technology Acceptance Model (TAM). Developed by Fred Davis in the 1980s, TAM attempts to explain reasons for user acceptance of information technology, highlighting two fundamental factors: perceived usefulness and perceived ease of use. (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989) According to TAM, perceived usefulness refers to "the degree to which a person believes that using a particular system would enhance his or her job performance." (Davis, 1989) Thus for the user, there exists a positive use-performance relationship. On the other hand, perceived ease of use is described as "the degree to which a person believes that using a particular system would be free of effort." (Davis, 1989) All else being equal, given two systems, user acceptance is more likely for the system that is perceived to be easier to use. Moreover, perceived ease of use is hypothesized to have a significant and direct effect on perceived usefulness. Again, given two systems with identical functionality, the system that is perceived to be easier to use will be more useful. (Davis, 1993)

Extensions of TAM

TAM has been extensively tested and replicated to examine a wide range of information technologies. Through numerous empirical studies, TAM has been proven to be a valid and reliable means of predicting information technology acceptance and use. TAM has subsequently been extended to incorporate additional constructs that determine user acceptance and usage behavior. Focusing on IT adoption and use in the workplace, Venkatesh and Davis (2000) developed and tested a theoretical extension of TAM. Referred to as TAM2, the extended model explains how social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use) affect perceived usefulness and usage intentions.

Empirical research has shown that trust is positively related to behavioral implications, specifically, loyalty and purchase intentions in online retail channels. (Chen, Griffith, & Wan, 2005) Gefen, Karahann, and Straub (2003) investigated the role of trust in addition to the traditional TAM antecedents in the context of online commerce. In another extension of TAM, Luarn and Lin (2005) propose the inclusion of one trust-related construct, perceived credibility, and two resource-related constructs, self-efficacy and perceived financial cost, to describe mobile banking acceptance behavior. Perceived credibility refers to the extent to which a person believes that the use of mobile banking will have no security or privacy threats. Perceived self-efficacy is defined as the judgment of one's ability to use mobile banking, while perceived financial cost takes into account the financial considerations that might influence one's behavioral intentions to use mobile banking. (Luarn & Lin, 2005) Luarn and Lin observed significant effects influencing behavioral intention from perceived usefulness, ease of use, credibility, self-efficacy, and financial costs.

Amberg, Hirschmeier, and Wehrmann (2004) posit that TAM is not sufficient for an advanced and balanced evaluation of mobile services, which depend highly on the contextual conditions of a service. Their model, the Compass Acceptance Model (CAM), includes perceived mobility and perceived costs constructs. (Amberg et al., 2004) Meso et al.'s (2005) findings indicate that access to mobile ICT strongly influences individuals' perceptions of the usefulness and ease of use of mobile ICT and that individuals' perceptions about the reliability of mobile ICT significantly influence the use of such technologies. (Meso et al., 2005)

In resource-poor countries, access to technology may be constrained by financial resources, thereby affecting a user's attitude towards technology adoption. Molony (2006) explores the trade-off between new technologies and the challenge of trust within the context of Tanzanian microenterprise networks. Given the pervasiveness of face-to-face communication in African microenterprise economies, the work concludes that trust is a hugely important issue in the use of ICT among African micro- and small enterprises. (Molony, 2006) Based on the literature related to the TAM extensions, it is justifiable to include additional constructs as TAM is extended to examine mobile payments in developing economies.

Personal Safety

Safety can be defined as the condition of being protected against physical, social, financial, and psychological damages. (Conci, Pianesi, & Zancanaro, 2009) Economic, social, and human development literature often highlights safety/security as a basic human need. Maslow's hierarchy of needs includes five basic needs: physiological needs, safety needs, love needs, esteem needs, and the need for self-actualization. In this hierarchy, safety needs are second only to physiological needs and are of such importance that they may recruit all the capacities of the organism in their service. (Maslow, 1943) Max-Neef's (1992) "Matrix of Human Needs" lists "protection" under its basic needs according to axiological categories. Max-

Neef contends that protection is among the needs that have existed since the appearance of *homo sapiens*. Nussbaum (2007) articulates human flourishing in terms of ten "Central Human Capabilities," – life, bodily health, bodily integrity, the development and expression of senses, imagination and thought, emotional health, practical reason, affiliation, relationships with other species, and the world of nature, play, and control over one's environment (both material and social). Of these varied capabilities, bodily integrity is described as the ability to move freely from place to place and to be secure against violent assault. (Nussbaum, 2007) Narayan, Chambers, Shah, and Petesch (2000) synthesized a multitude of poverty assessments conducted by the World Bank to identify critical dimensions of wellbeing. Such dimensions include: material wellbeing, bodily wellbeing, social wellbeing, security, and freedom of choice and action.

In light of the importance of safety to human beings, researchers have examined the influence of safety needs on the adoption and use of technology. Specifically, Woelfer, Iverson, Hendry, Friedman, and Gill (2011) investigated mobile phones as instruments for improving the safety of homeless young people in Seattle, Washington. In exploring the mobile phone boom in Africa, Kyem and LeMaire (2006) state that one of the frequently cited reasons for owning a mobile phone is the added safety. Conci et al. (2009) presented an empirical model of acceptance of mobile phones by older adults. This model is based on an extension of TAM, which introduces the construct of perceived safety. The researchers found that perceived safety significantly affected perceived usefulness.

In addition to the aforementioned constructs, TAM should be extended to include perceived personal safety. In developing economies, trading tends to be physically risky in terms

of traffic accidents and crime. (Jagun et al., 2008) It is expected that perceptions about the technology user's personal safety will also influence the degree to which the technology is used.

Research Questions and Hypotheses

Based on the literature review, the following research questions and hypotheses are proposed. First, what are the technology acceptance factors that explain the adoption of mobile payments in microenterprises in Kenya and Tanzania and what is their relative influence?

Perceived usefulness (PU)
H1: Perceived usefulness has a positive effect on microentrepreneurs' use of mobile payments for business transactions.

Perceived ease of use (PEOU)
H2: Perceived ease of use has a positive effect on microentrepreneurs' use of mobile payments for business transactions.

Perceived trust (PT)
H3: Perceived trust in mobile payments has a positive effect on microentrepreneurs' use of mobile payments for business transactions.

Perceived reliability (PR)
H4: Microentrepreneurs' perceptions about the reliability of mobile payments have a positive effect on microentrepreneurs' use of mobile payments for business transactions.

Perceived safety (PS)
H5: Perceived personal safety when using mobile payments has a positive effect on microentrepreneurs' use of mobile payments for business transactions.

Perceived financial cost (PFC)
H6: Perceived financial cost of mobile payments has a negative effect on microentrepreneurs' use of mobile payments for business transactions.

Subjective norm (SN)
H7: Subjective norm has a positive effect on microentrepreneurs' use of mobile payments for business transactions.

Second, what is the impact of such an adoption on perceived microenterprise growth?

Outcome expectations (OEX)
H8: Mobile payment use has a positive effect on the growth of microenterprises.

Because microenterprise growth has implications for the alleviation of poverty through economic growth, understanding the second question will help policy makers better understand the role of mobile payments as an enabler of development. By understanding the key factors

influencing the way in which microenterprises adopt mobile payments, investigated in the first question, policy makers can design and implement strategies to promote or inhibit penetration of such technology.

Investigating the impact of mobile payments on microenterprises in sub-Saharan Africa will help in promoting the adoption of such technology as one means of alleviating poverty. The findings will have implications for economic development practitioners, mobile network operators, and most critically microenterprises and their communities. The study will further the understanding of mobile payments' contribution to the economic growth of microenterprises while providing insight into how mobile payments may foster indigenous development effort and entrepreneurship.

Research Model

This work has important implications for the TAM model. The research model depicted in Figure 2 is proposed. The model builds on the original TAM and incorporates additional constructs. These constructs include perceived safety, perceived trust, and subjective norm, all of which are likely to be relevant within the context of mobile payment usage in developing economies. These constructs, selected from the published literature, have been theorized as having strong influences on usage behavior. Below, each of the constructs is defined.

Perceived usefulness (PU) and perceived ease of use (PEOU)

Davis's (1989) original TAM links users' perceptions of technology usefulness to technology usage. Numerous empirical tests have supported the significance of this factor on technology adoption. (Davis, 1989; Davis et al., 1989; Gefen et al., 2003; Luarn & Lin, 2005; Venkatesh & Davis, 2000) Traditional TAM studies have also provided empirical evidence of the influence of perceived ease of use on technology usage. (Davis, 1989; Davis et al., 1989;

Gefen et al., 2003; Luarn & Lin, 2005; Venkatesh & Davis, 2000) These factors are also expected to have an impact on microentrepreneurs' use of mobile payments.

Perceived trust (PT)

Previous research has established the importance of trust as an antecedent of participation in electronic commerce and use of mobile services. (Gefen et al., 2003; Luarn & Lin, 2005) Gefen et al. (2003) explain that trust emanates from the security that the user feels about a situation, resulting from guarantees, safety nets, or other structures. They also note that, in business transactions, trust determines the very nature of the utility expected. In the mobile payment context, adoption is likely to be affected by users' trust in the mobile network operator and in the safety and security of the mobile payment system. Trust has also been found to be a critical issue in African business culture. (Molony, 2006) It is expected that trust will influence the use of mobile payments. Microentrepreneurs who are less confident in the safety of mobile payments are likely to limit their use of the technology.

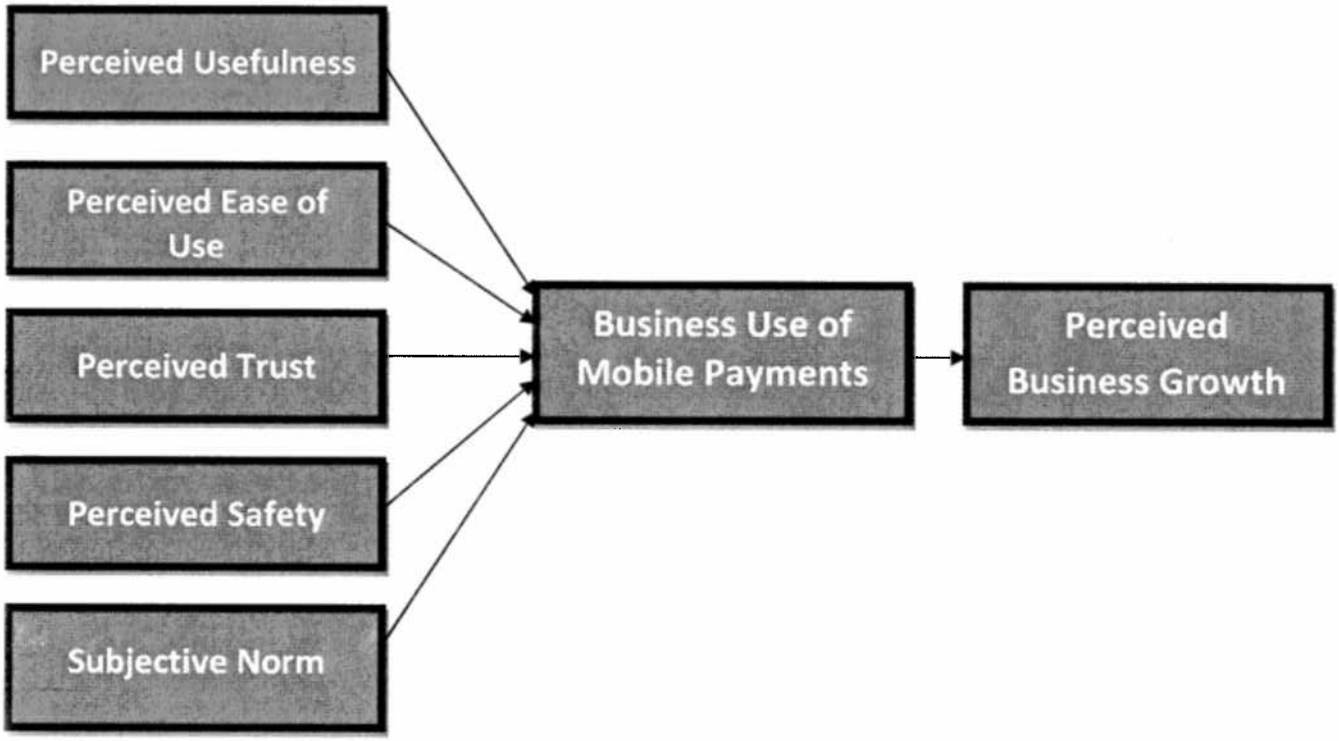
Perceived safety (PS)

Prior studies have examined the effects of perceived safety on mobile phone usage. (Conci et al., 2009; Woelfer et al., 2011) In their work involving African microenterprises, Jagun et al. (2008) found that mobile phones reduced some of the physical risks associated with commerce. In particular, mobile phone usage reduced the number of journeys, often a source of physical risk, required to conduct business. Similarly, mobile payments play a role in reducing the physical risk associated with cash transfers. (Mas & Radcliffe, 2010) It is posited that the perceived safety associated with mobile payments influences the use of mobile payments.

Subjective norm (SN)

The TAM extension proposed by Venkatesh and Davis (2000) includes subjective norm. Their work showed that when usage was mandatory, subjective norm had an effect on intention to use. However, in cases where usage was voluntary, subjective norm had no significant effect on intention. Gefen et al. (2003) indicate that subjective norm has the most influence when potential users have little experiential data about a technology. In this case, the users look to their social environment to increase their familiarity with the technology and to assess trustworthiness. In the context of developing economies, where informational challenges abound and access to experiential data may be limited, subjective norm is expected to influence the adoption of mobile payments by microentrepreneurs.

Figure 2: Research Model



CHAPTER 3: METHODOLOGY

Location of the Study

As previously noted, Kenya and Tanzania are experiencing significant rates of urbanization as their inhabitants move away from jobs in the agriculture sector towards wage jobs or non-agricultural self-employment. This growth is particularly marked in Nairobi, Kenya and Dar es Salaam, Tanzania. Job growth, however, has been unable to match population growth in urban areas, especially with respect to modern sector wage jobs. (African Development Bank Group, 2012a; African Development Bank Group, 2012b) Many of the newcomers to urban society are thus likely to find employment within microenterprises or to become microentrepreneurs themselves.

Given these circumstances, the study was conducted in Nairobi and Dar es Salaam. These cities were chosen for several reasons. Nairobi is Kenya's capital and most populous city with over 3 million inhabitants. (World Bank, 2012d) It is also home to the largest concentration of Safaricom cell towers. (Jack & Suri, 2011) Likewise, Dar es Salaam is Tanzania's commercial capital and largest city, with a population of over 3 million. (World Bank, 2012b; Central Intelligence Agency, 2013b; Materu-Behitsa & Diyamett, 2010) Of all Tanzanian cities, Dar es Salaam has the greatest household access to mobile phones (91 percent as of 2011). (AudienceSpaces, 2011) Furthermore, in recent years, these cities have had the largest influxes of their respective nations' rural population. (Opiyo, 2009; World Bank, 2011) The focus on similar-sized cities with similar importance to their nations' economies will allow for an effective comparison of the data collected.

Sampling and Data Collection

Research for this study was carried out in Nairobi and Dar es Salaam in February and March 2013. Urban microenterprises in the service, trade, manufacturing, and retail sectors were

selected from the following areas: Nairobi – Central Business District, the Park Road area of Pumwani, Kangemi, and Uptown. In Dar es Salaam, microentrepreneurs from Mlimani City Mall and the Mwenge shopping district were selected.

These areas were chosen to provide a variety of microenterprises, both formal and informal, that cater to businesses and consumers of varied socio-economic levels. For instance in Nairobi, microenterprises within the Central Business District and Uptown tend to serve low-, middle-, and upper-income consumers. Microenterprises in the Central Business District also provide goods and services to local businesses. On the other hand, microenterprises found within low-income areas, such as Kangemi and the Park road area of Pumwani, provide goods and services to low-income consumers and local businesses.

In Dar es Salaam, Mlimani City Mall is a western-style shopping mall with formal businesses that cater to middle- and high-income consumers. The Mwenge district has numerous shops that target low- and middle-income consumers as well as small businesses. In this area, many of the microenterprises were informal and located in semi-permanent buildings and open air markets. Some of the microenterprises were housed in permanent structures that served both as business and residential locations of the owner. While most of the customers in this area are low- and middle-income consumers, some individuals buy for business purposes from wholesale shops.

Kenya and Tanzania are geographically large and surveying individual locales throughout each country's geographical regions proved impractical. Given the exploratory nature of this study and the high concentration of microenterprises in Nairobi and Dar es Salaam, convenience sampling was used to select the respondents. These individuals were recruited face-to-face in malls, open-air marketplaces, and entrepreneurial complexes (semi-permanent and permanent

buildings). In general, the level of cooperation was very high. It should be noted that the sampling may be biased towards formal registered businesses, unlike many of the businesses found elsewhere in the urban and rural areas of Kenya and Tanzania.

Survey Method

To evaluate and examine the aforementioned hypotheses and research model, the study entailed the use of a survey instrument supplemented by in-depth interviews. These data collection methods were used to reinforce one another. The survey instrument provides a data set for quantitative analysis, while the in-depth interviews provide qualitative information regarding microentrepreneurs' attitudes and perspectives on mobile payments. The survey instrument, a questionnaire, was developed following a review of the technology diffusion literature, in particular, studies pertaining to e-commerce, mobile telephony, and mobile services. The survey instrument included relevant constructs from previous studies modified for the mobile payment context and consisted of scales developed for TAM. The survey measured microenterprise owners' or managers' perceptions of mobile payments and the factors that influence microenterprise adoption of mobile payments. The survey collected demographic information as well as data pertaining to mobile payment usage in the business setting, the financial performance of the microenterprises, and the motivation of the microentrepreneurs to use mobile payments. In order to construct the survey, previously tested questions were referenced and generally accepted guidelines for building survey instruments were followed. (Donner, 2004; Meso et al., 2005; Chew et al., 2011)

The initial survey instrument was given to researchers from East African academic institutions (University of Dar es Salaam School of Business and University of Nairobi) with specific expertise in Marketing and mobile payment diffusion in Africa. Their input was used to refine the survey instrument and to ultimately develop the final version. Two versions of the

questionnaire were developed, one in English for respondents in Nairobi and one in Swahili for respondents in Dar es Salaam. The questionnaires were completed in person and on a voluntary basis. No incentive was provided for the completion of the questionnaire. A total of 164 surveys were completed in Nairobi and a total of 167 surveys were completed in Dar es Salaam.

To ensure variety, in-depth interviews were conducted with microenterprise operators within each city. Again, the participants were asked to participate voluntarily. Interviews generally ran for 20 to 30 minutes. The in-depth interviews focused on understanding motivations for using mobile payments, specific factors that helped or hindered usage, specific concerns with using mobile payments, and the effects that mobile payments have had on the business's operations and success. A total of fifteen interviews were completed – 8 in Nairobi and 7 in Dar es Salaam. Interviews were conducted in English in Nairobi. In Dar es Salaam, interviews were conducted in Swahili; a graduate student in economics from the University of Dar es Salaam School of Business provided translation services for these interviews.

CHAPTER 4: RESULTS

Sample Characteristics

Of the 331 completed surveys, 324 were completed by owners/managers of microenterprises (ten workers or fewer) and thus were usable for further analyses. Ninety-one percent of the microenterprises reviewed had between one and five workers; 9 percent employed between six and ten workers. The final respondent sample was split nearly evenly between the two countries – Kenya (49.1 percent) and Tanzania (50.9 percent). Of the 324 respondents, 299 indicated their gender. One hundred twenty (40.1 percent) respondents were female and 177 (59.2 percent) were male. Of note, 54.9 percent of the Kenyan respondents were male and 43.7 percent were female. In Tanzania, a larger proportion of respondents were male (63.1 percent – male; 36.9 percent – female). A majority of respondents (63 percent) were between the ages of 20 and 34; 29 percent were between the ages of 35 and 54. Such findings are in agreement with studies pointing to the youthful workforce in these nations. (World Bank, 2012b; World Bank, 2012f) When it came to education, most of the respondents had completed primary school (19.2 percent) or secondary school (48.9 percent), while some reported receiving university certificates (23.8 percent).

Of these microenterprises, 47.8 percent were in the retail sector. Typical businesses in this sector included sellers of clothing, electronics and computer supplies, groceries, and phone time top-up vouchers. Many (39.2 percent) of the microenterprises were service sector businesses, providing such services as food, printing, hair styling, and mobile payment services. The trade and manufacturing sectors provided the fewest number of respondents with 30 (9.3 percent) and 27 (8.3 percent), respectively. The trade sector included wholesalers of food, clothing, cigarettes, and automobile parts, while the manufacturing sector included primarily furniture and clothing manufacturers. Table 5 summarizes the sample characteristics.

Table 5: Sample Characteristics

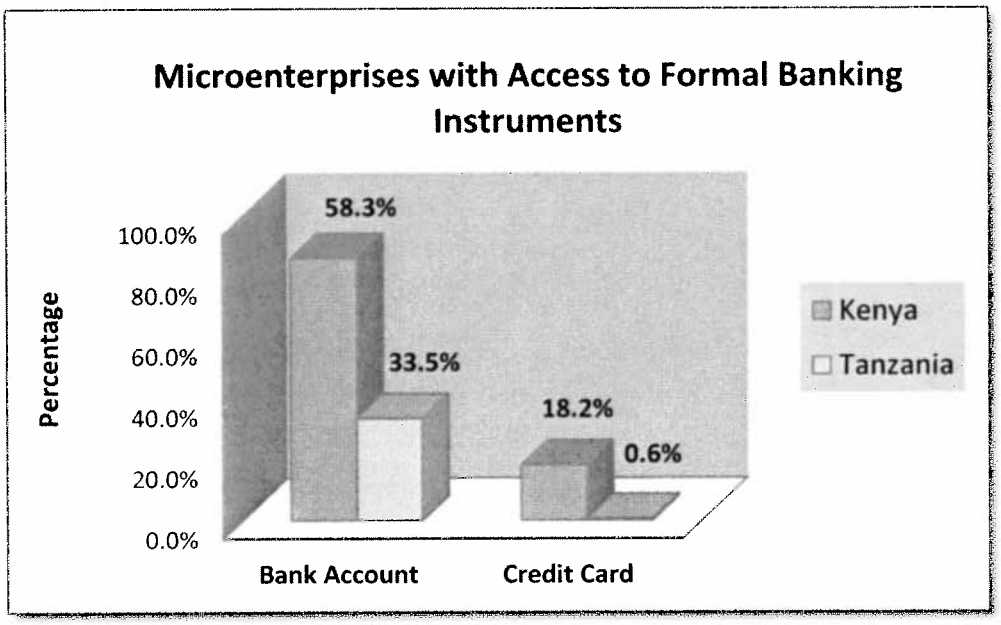
	Total (n)	Total (%)	Kenya n = 159 (%)	Tanzania n = 165 (%)
Gender				
Female	120	59.2%	54.9%	63.1%
Male	177	40.1%	43.7%	36.9%
Age				
Under 20 years	8	2.5%	0.6%	4.4%
20 – 34 years	200	63.1%	61.8%	64.4%
35 – 54 years	92	28.4%	28.0%	30.0%
55 and above	16	4.9%	8.9%	1.3%
Education				
No formal schooling	8	2.5%	4.5%	0.6%
Primary certificate	61	19.2%	8.3%	30.0%
Secondary certificate	155	48.9%	35.7%	61.9%
Bachelor's degree	77	24.3%	42.0%	6.9%
Graduate degree	15	4.7%	8.9%	0.6%
Business size				
5 workers or fewer	294	91.0%	86.7%	95.2%
Six to 10 workers	29	9.0%	13.3%	4.8%
Business Sector*				
Retail	155	48.4%	45.3%	48.4%
Services	127	39.7%	44.0%	35.4%
Trade	30	9.4%	8.8%	9.9%
Manufacturing	27	8.4%	1.9%	14.9%

**Percentages do not add up to 100 as respondents could choose more than one sector.*

With respect to formal banking access, 172 respondents (53.1 percent) indicated that there was a bank account for the business. Alternatively, only 4 percent of the microenterprises had access to a credit card for the business. A comparison of the two countries shows that Kenyan microentrepreneurs had far greater access to formal banking services. Specifically, 86.1 percent of Kenyan respondents indicated that they had access to a formal bank account for the

business; in Tanzania, only 33.5 percent of microentrepreneurs reported having a formal bank account for the business (Figure 3).

Figure 3: Access to Formal Bank Account



Mobile Payment Usage

Most of the respondents (98.4 percent) reported having a mobile phone. The proportion of respondents with mobile phones did not vary greatly by country: Kenya – 99.4 percent; Tanzania – 97.6 percent. Also, a majority of respondents (77.5 percent) reported having used mobile payments for business purposes including paying suppliers, paying employees and receiving payment from customers. On average, the respondents reported that they began using mobile payments for business purposes less than two years ago. In Kenya, most respondents began using mobile payments for business purposes over three years ago, while Tanzanian respondents began a little over 9 months ago.

The data suggest that the microentrepreneurs surveyed utilize their mobile payment accounts primarily as a payment mechanism rather than as a bank account. Specifically, 75 percent of respondents kept less than half of their business funds in their mobile payment

accounts. During interviews, microentrepreneurs, especially in Kenya, reported frequently transferring funds between their mobile payment accounts and formal bank accounts. Most Kenyan microentrepreneurs that were surveyed used their mobile payment accounts in conjunction with formal bank accounts. In this context, the results challenge the notion that mobile payments are promoting fuller financial inclusion.

As Figure 4 shows, of the microenterprises surveyed, 49.1 percent report moderate use of mobile payments to pay suppliers (half the time or less than half the time). Turning to Figure 5, which provides country level data, a majority of Kenyan microenterprises (59.4 percent) indicate moderate use of mobile payments to pay suppliers, whereas 39.3 percent of Tanzanian microenterprises report moderate use. In Tanzania, 58.3 percent of the microenterprises sampled never use mobile payments to pay suppliers.

Figure 4: Mobile Payments to Pay Suppliers

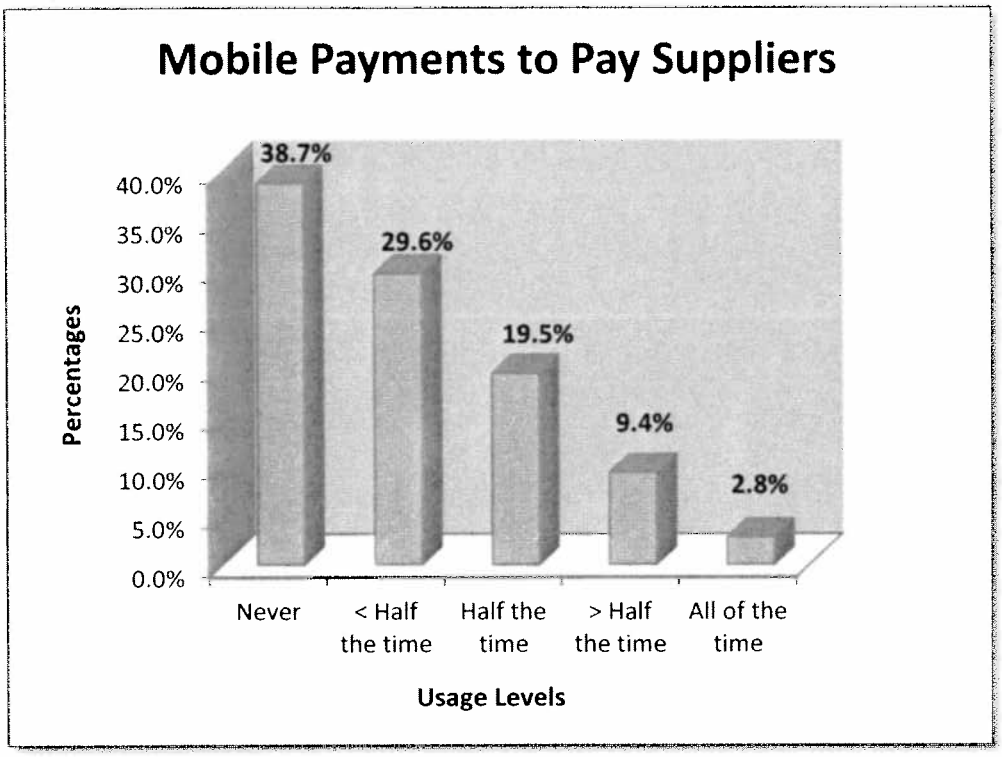
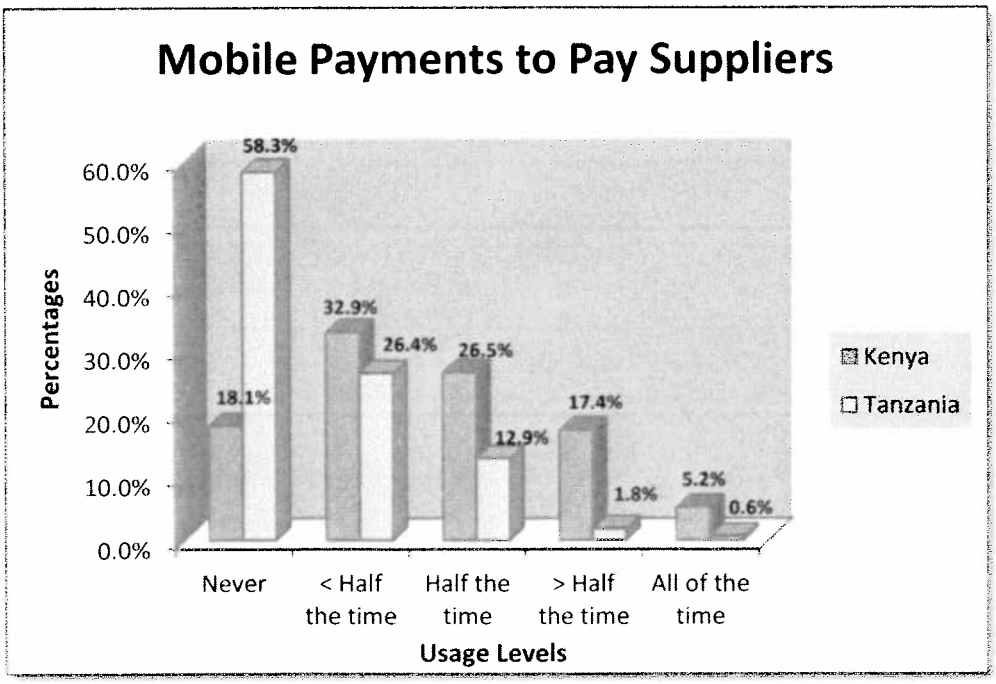


Figure 5: Mobile Payments to Pay Suppliers – Kenya vs. Tanzania



In this sample of microenterprises, usage of mobile payments for paying employees was rather low. A total of 73.1 percent of respondents never use mobile payments to pay employees. In conversations with microentrepreneurs, some described using mobile payments to pay employees as a last resort, typically used when the owner had little cash on hand or when the employee was located some distance from the place of business. When it comes to paying employees, cash remains king.

Figure 6: Mobile Payments to Pay Employees

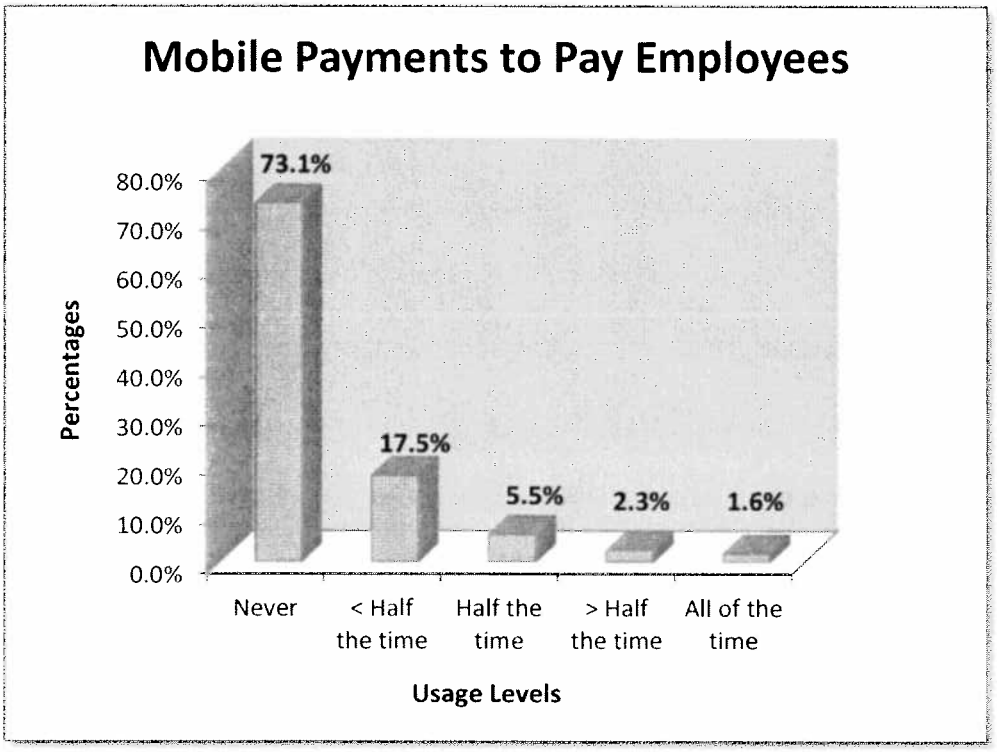
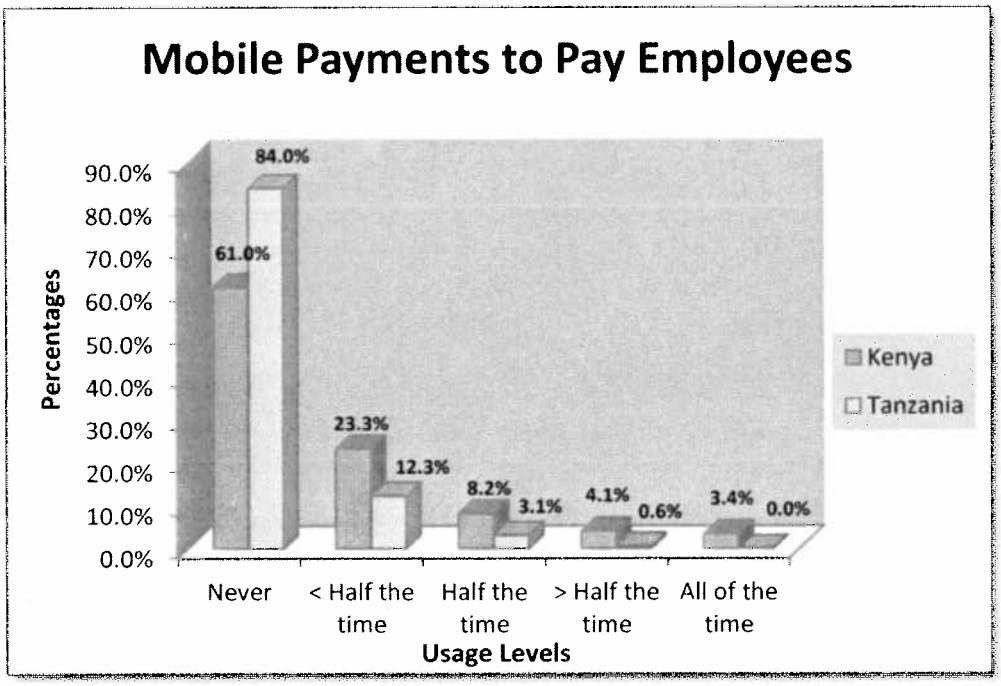


Figure 7: Mobile Payments to Pay Employees – Kenya vs. Tanzania



Of the three types of business transactions highlighted (paying suppliers, paying employees, receiving payment from customers), mobile payment usage seems to be highest for receiving payments from customers. In total, 47.2 percent of respondents indicate moderate use of mobile payments for receiving payments from customers and 15.1 percent report high usage of mobile payment for this purpose (Figure 8). When it comes to receiving payment from customers, the levels of usage differ markedly by country (Figure 9). Whereas only 8.2 percent of Kenyan respondents never receive payments from customers via mobile payment, 66.1 percent of Tanzanian microenterprises never receive payment from customers via mobile phone. Similarly, 25.1 percent of Kenyan microenterprises report high usage levels (more than half the time or all of the time) for such business transactions. Only 4.8 percent of Tanzanian respondents indicate high usage levels. Anecdotally, interviews with Kenyan and Tanzanian respondents

further highlight these contrasts. While Kenyan interviewees explained that many customers ask to pay with mobile payments, Tanzanian interviewees described incidences of having to show customers how to use mobile payments to purchase goods from the business.

The data related to the three types of business transactions, along with the anecdotes, point to the well-documented differences in penetration rates of mobile payments within the two societies. These findings also suggest that, in Kenya, mobile payments are an integral part of microenterprises' supply chain.

Figure 8: Mobile Payments to Receive Payment

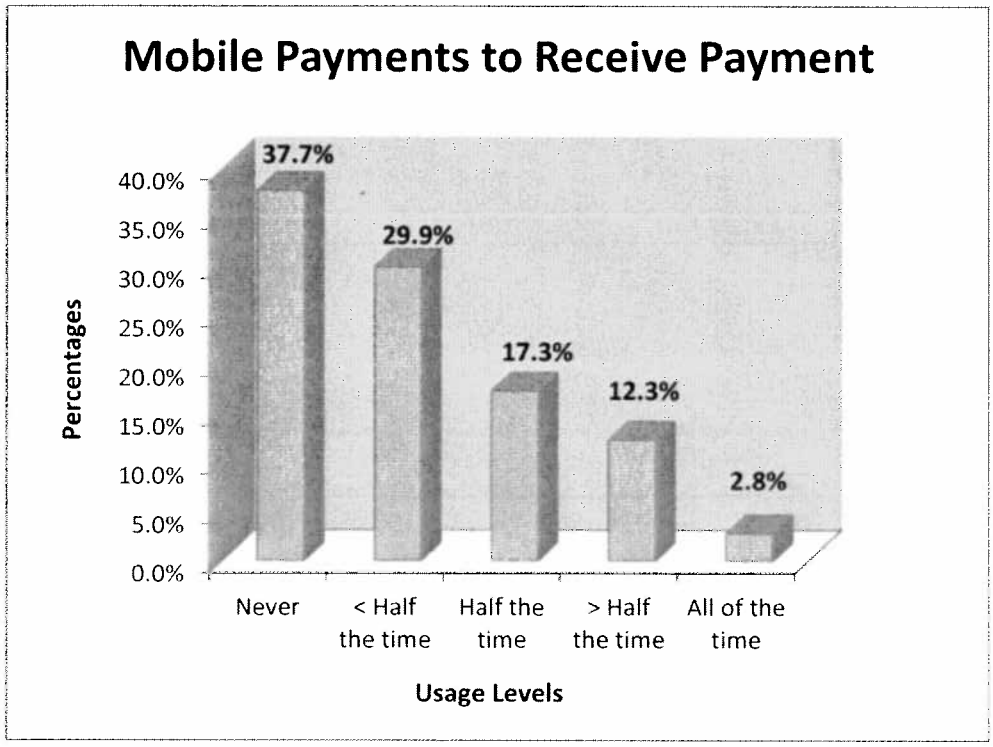
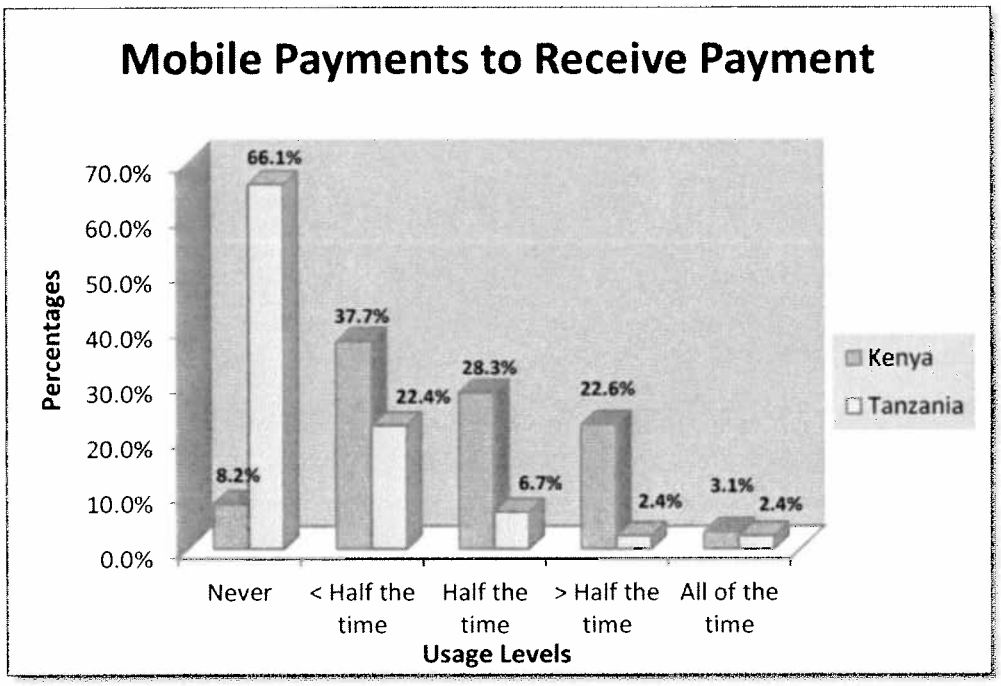


Figure 9: Mobile Payments to Receive Payment – Kenya vs. Tanzania



Mobile Payment Adoption Factors

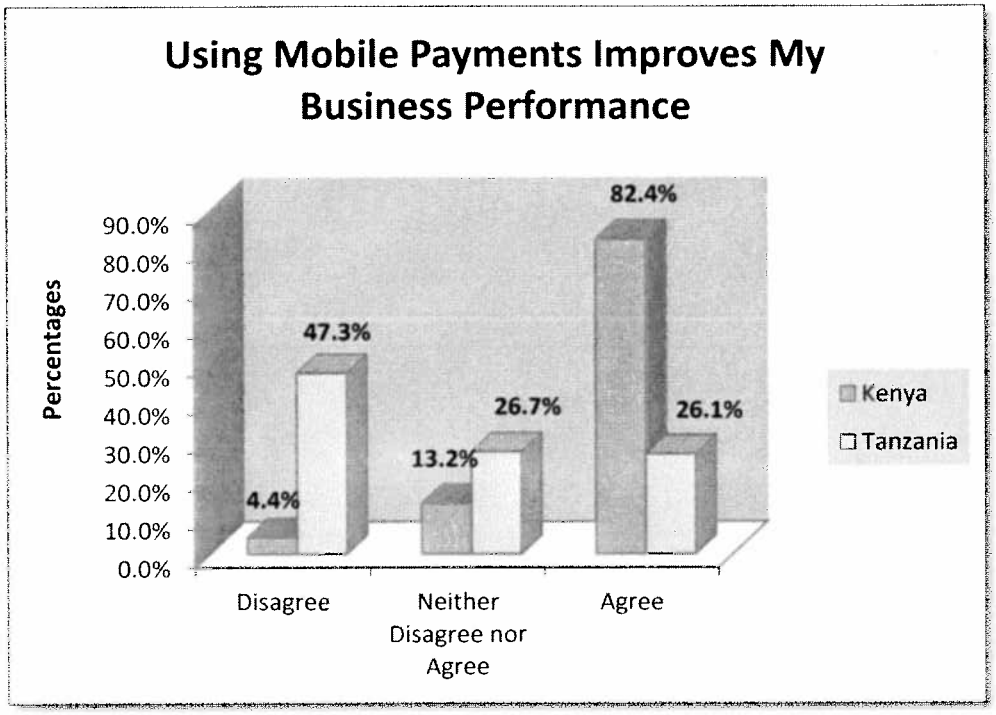
To explore the research questions, respondents were asked to indicate their level of agreement with various statements related to the adoption of mobile payments and perceived business growth. Given the varied levels of education and the language difficulties in certain cases, a simplified version of the traditional Likert scale using only three points – Disagree, Neither Disagree nor Agree, and Agree, was used. Descriptive data for the responses to these statements are shown in Table 7. The standard deviations of the items for the entire group show fairly high dispersion. Items were reviewed by country and distinct differences were noted. Overall, these results highlight key distinctions between the attitudes and behaviors of Kenyan and Tanzanian microentrepreneurs vis-à-vis mobile payments. In many cases, twice as many respondents in Kenya answered favorably towards mobile payments than in Tanzania.

Table 6: Descriptive Statistics

Statement	Total % Agree (Mean, Standard deviation)	Kenya % Agree	Tanzania % Agree
1. Using mobile payments improves my performance in conducting business.	53.7 (2.27, .852)	82.4	26.1
2. Mobile payments are useful in doing business.	63.9 (2.53, .688)	89.3	39.4
3. Getting the money to people is faster when I use a mobile phone.	67.6 (2.55, .706)	90.4	46.1
4. Learning to use mobile payments was easy for me.	69.3 (2.52, .766)	90.4	49.1
5. Mobile payments are easy to use.	69.9 (2.53, .772)	93.5	47.9
6. Using mobile payments takes too much time from normal duties.	12.1 (1.47, .702)	7.6	16.4
7. Working with mobile payments is very complicated.	12.1 (1.46, .701)	3.8	20.0
8. The mobile phone company is trustworthy.	53.4 (2.36, .757)	75.5	32.1
9. I think my money will be safe when I receive it on my phone.	60.2 (2.53, .622)	78.0	42.9
10. I trust the agent who takes my money will treat me fairly and not charge too much.	44.8 (2.22, .791)	68.6	22.1
11. Mobile payments are safe to use to pay others.	59.4 (2.47, .704)	86.6	32.9
12. Mobile payments are safe to use to get paid.	57.4 (2.43, .737)	85.7	30.7
13. I feel personally safer when I use mobile payments to pay rather than cash.	43.1 (2.18, .806)	65.0	22.1
14. My mobile service is reliable.	58.4 (2.45, .720)	81.5	36.2
15. My mobile handset is reliable.	64.0 (2.52, .701)	91.7	36.9
16. Mobile payments are reliable.	59.0 (2.45, .731)	85.1	34.2
17. It does not cost me much to pay or get paid using my phone.	30.4 (1.97, .800)	36.5	24.4
18. Overall, it is cheaper for me to pay with mobile payments than with other forms of payment.	37.0 (2.05, .828)	42.4	31.7
19. People who are important to me think that I should use mobile payments.	31.4 (1.97, .811)	44.2	19.1
20. Using mobile payments has helped my business grow.	50.9 (2.24, .851)	74.4	28.4

The differences in responses to statements 1, 5, 12, and 13 highlight key differences in mobile payment usage in each country. Statement 1 relates to the perception that mobile payments improve business performance. When looking at the aggregate, a majority of respondents (53.7 percent) agree with the statement. However, as shown in Figure 10, 82.4 percent of Kenyan microentrepreneurs agree, while only 26.1 percent of Tanzanians agree. There is a notable difference in the perceptions of mobile payments being beneficial to business between the two countries.

Figure 10: Mobile Payments Improve My Business Performance

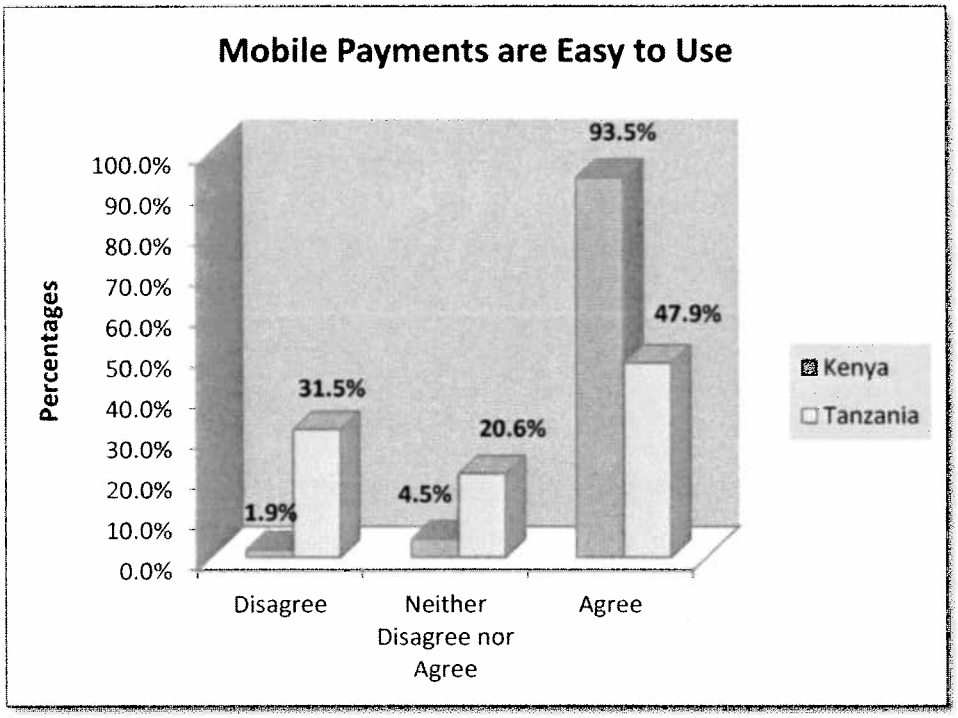


Based on the results depicted earlier in Figure 5, Figure 7, Figure 9, Tanzanians report lower levels of mobile payment usage for business purposes. Moreover, the average Tanzanian microenterprise in this sample began using mobile payments less than a year ago. Such data indicate that Tanzanians, in general, have less direct experience with mobile payments than

Kenyans. Tanzanians' lack of personal experience with mobile payments may help to explain why nearly half (47.3 percent) of Tanzanian respondents did not perceive mobile payments as being helpful for business performance. In contrast, Kenyan microentrepreneurs reported much higher mobile payment usage levels. This implies that their more favorable feelings towards outcome expectations are based on actual use of mobile payments.

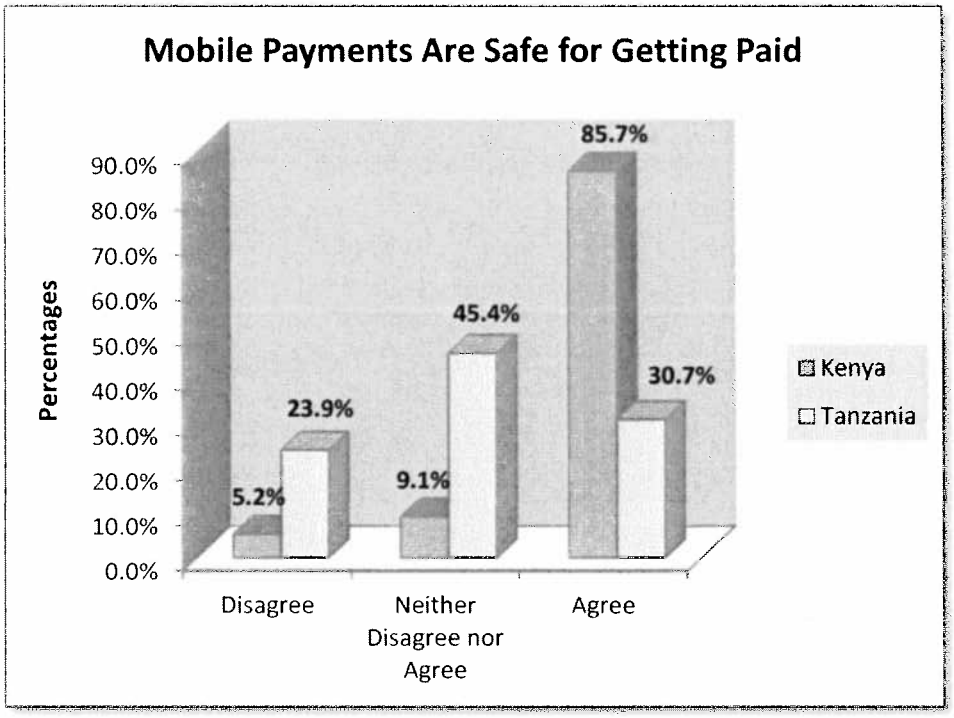
Looking at Figure 11, which charts responses to the statement "Mobile payments are easy to use," 93.5 percent of Kenyan respondents agree. In contrast, 47.9 percent of Tanzanians agree. These responses indicate a clear difference in mobile payments' perceived ease of use between the two sample groups. This is somewhat surprising given that M-PESA entered the Tanzanian market just one year after it was launched in Kenya. The data hint at dissimilar levels of product education in each country. The differences may also relate to the levels of personal experience that each sample group has had with mobile payments. The differing levels of personal experience may also explain why 31.5 percent of Tanzanians do not feel that mobile payments are easy to use. In contrast, only 1.9 percent of Kenyan respondents share this sentiment.

Figure 11: Mobile Payments are Easy to Use



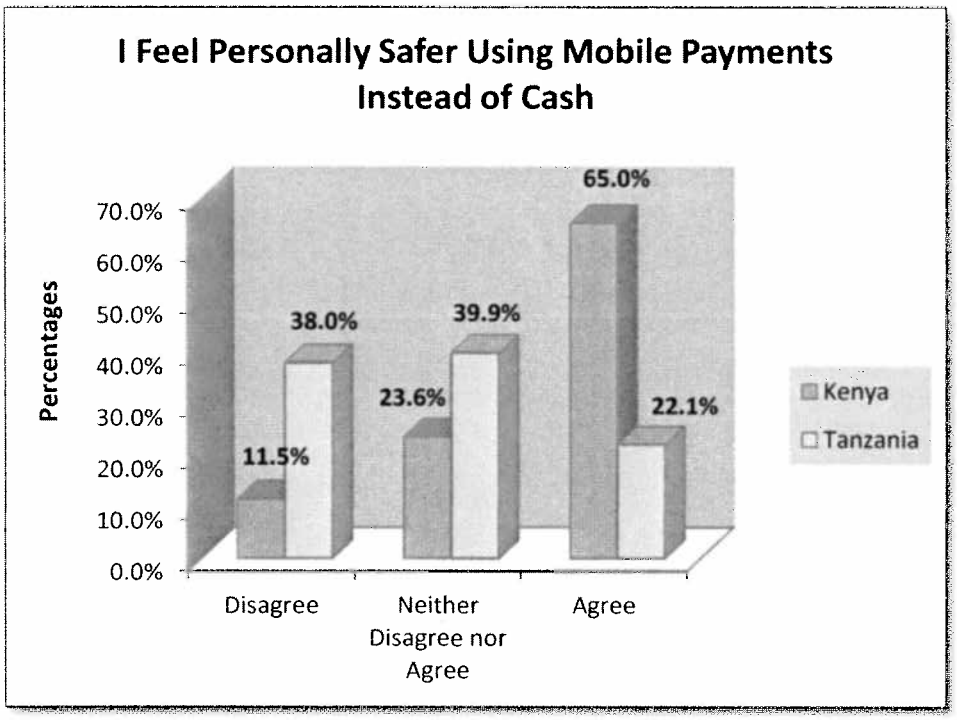
Perceived trust as measured by the statement "Mobile payments are safe to use to get paid," and depicted in Figure 12, also highlights a distinction between the two samples. In Kenya, 85.7 percent of respondents agree. On the other hand, 45.4 percent of Tanzanians provide the response, "Neither Disagree nor Agree". The level of neutral responses in Tanzania may indicate a more general lack of familiarity with mobile payments. Again, it also relates back to the different levels of personal experience with mobile payments between the two sampled groups.

Figure 12: Mobile Payments are Safe for Getting Paid



When it comes to personal safety, 65.0 percent of Kenyans and 22.1 of Tanzanians agree with the statement "I feel personally safer when I use mobile payments to pay rather than cash" (Figure 13). Responses obtained during the interviews in Nairobi underscore this point. Kenyan interviewees explained that mobile payments allowed them to store money on their mobile phones in an account locked by a unique personal identification number (PIN). Even if the phone is stolen or lost, the money cannot be accessed, thereby providing a certain degree of security. These responses may also point to the different levels of personal safety perceived by users in Nairobi and Dar es Salaam. Generally speaking, Kenya and Nairobi have higher rates of crime than Tanzania, where the risk of robbery is lower. (Camner, Pulver, & Sjoblom, 2009)

Figure 13: Mobile Payments Are Safer than Cash



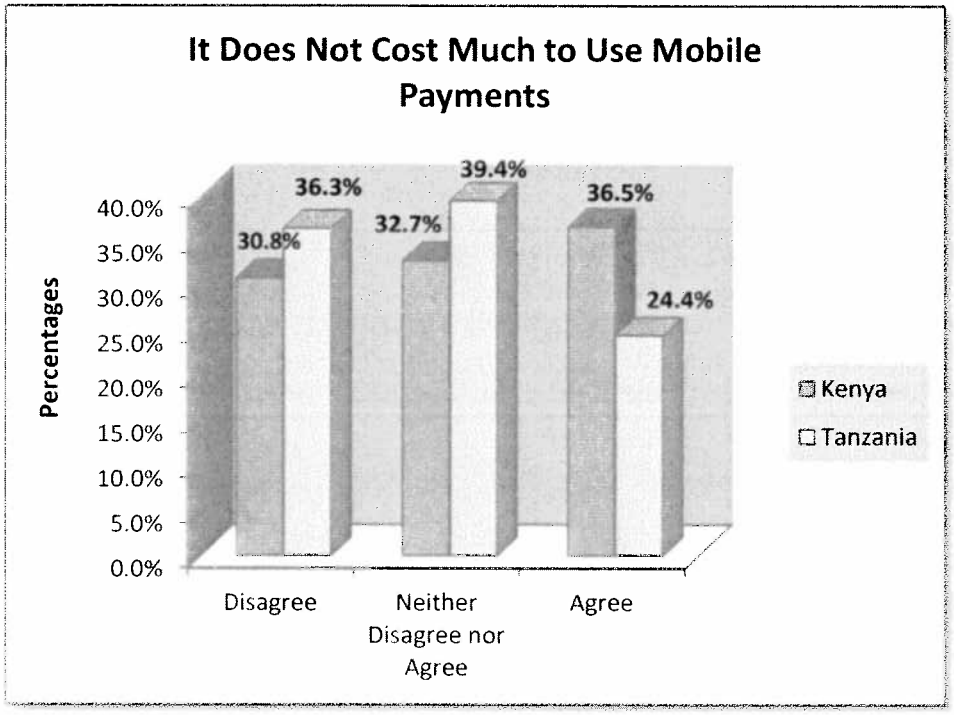
Finally, with respect to cost and the statement "It does not cost me much to pay or get paid using my phone," the difference in responses between the groups is considerably lower (Figure 14). Roughly one-third of the respondents in each country believe that mobile payments are more expensive than other forms of payment, roughly one-third are neutral, and roughly one-third believe mobile payments are cheaper.

Responses collected during the in-depth interviews provide some additional insight. Some microentrepreneurs, especially in Kenya, were dissatisfied with the increase in tariffs that took place in February 2013. Certain interviewees also noted that they enjoyed the ease of cash, which was not subject to the tariffs or network interruptions associated with mobile payments. Even so, they explained that mobile payments often allowed them to transfer payments received from customers directly to their bank accounts without having to stand in long bank lines. An owner of a women's clothing and accessory shop in Kenya echoed the sentiment of other interviewees when she noted that money stored in a mobile money account is safe and thus

cannot be easily stolen. In Tanzania, a tuk-tuk (a small vehicle for transporting people) driver said that mobile payments allowed him to send money to his family during the workday. As such, he did not have to leave his post, potentially missing out on fares. An interviewee in an office supply store/M-PESA agent in Tanzania preferred mobile payments as they eliminate the worry of receiving counterfeit bills. Other interviewees, particularly in the retail sector, recounted instances of consumer impulse buying. A consumer, desiring an item, may not have cash; however, he/she can make the purchase using mobile payments. The interviewees noted that it is better to accept the mobile payment than to miss an opportunity for a sale.

These anecdotes suggest that it may be difficult for users to make comparisons across payment forms. The simplicity and low transaction costs of cash may be favorable to some. Alternatively, for others, mobile payments may compare favorably when the costs in terms of waiting time, lost income, personal risk, or reduced convenience are considered.

Figure 14: Mobile Payments Do Not Cost Much



Tests of Hypotheses

Analysis of variance (ANOVA) is a widely used statistical technique that tests the significance of group differences by comparing means of two or more samples using the F-distribution. (Mertler & Vannatta, 2002; Padashetty & Kishore, 2013) The means of groups formed by values of the independent variable are compared to determine if they differ enough to not have occurred by chance. (Lee, 2010) ANOVA can be useful in assessing the impact of a factor on consumer response and has been used in prior studies of technology adoption. (Lee, 2010) While the term ANOVA refers to a class of techniques, the simplest is the one-way ANOVA. It allows one to test whether a single factor is relevant in explaining variability for a single target variable. (Mazzocchi, 2008) In this study, a one-way ANOVA test allows us to study the effect of different adoption factors on the adoption of mobile payments for business transactions. Thus the one-way ANOVA technique was used to test the hypotheses. IBM SPSS Statistical Package Version 19 was used for this analysis.

The first step in the process is to specify all independent and dependent variables. To measure mobile payment adoption for business transactions, the dependent variable, two items were used: "How often do you use mobile payments to pay people who sell you goods/services?" and "How often do you use mobile payments to receive payment from customers?" As was mentioned, microentrepreneurs in the sample were most likely to use mobile payments for paying suppliers or receiving payment from customers rather than for paying employees. A five-point scale with responses ranging from Never to All of the time was employed. The various perceived benefits of mobile payments, as well as subjective norm, were measured using a total of 15 survey statements. In this case, a three-point scale – Disagree, Neither Disagree nor Agree, and Agree, was used. These statements were used as the independent variables.

One-way ANOVAs were conducted to uncover the main effects (direct effects of an independent variable on the dependent variable) of said independent variables on microentrepreneurs' usage of mobile payments to pay suppliers and to receive payment from customers. The results of the one-way ANOVA tests are listed in Table 7. After reviewing the results from the one-way ANOVA tests, it was found that hypotheses H1, H3, H4, H5, H6, and H7 were supported. H2 was only partially supported whereby perceived ease of use, as measured by the perception that learning to use mobile payments is easy and the perception that mobile payments are easy to use, has a positive effect on microentrepreneurs' use of mobile payments for business transactions.

Table 7: Outputs of One-way ANOVA – Impact of Factors on Mobile Payment (MP) Adoption

Construct	Independent variable	Dependent variable	F-statistic	p-value
PU	**Using mobile payments improves my performance in conducting business.**	MP to pay suppliers	28.992	< 0.001
		Receive MP from customers	37.041	< 0.001
PEOU	**Learning to use mobile payments was easy for me.**	MP to pay suppliers	50.722	< 0.001
		Receive MP from customers	61.749	< 0.001
	Mobile payments are easy to use.	MP to pay suppliers	64.449	< 0.001
		Receive MP from customers	56.389	< 0.001
	Working with mobile payments is very complicated.	MP to pay suppliers	5.027	0.026
		Receive MP from customers	.728	0.394
PT	**The mobile phone company is trustworthy.**	MP to pay suppliers	51.823	< 0.001
		Receive MP from customers	57.451	< 0.001
	I think my money will be safe when I receive it on my phone.	MP to pay suppliers	15.816	< 0.001
		Receive MP from customers	14.370	< 0.001
	Mobile payments are safe to use to pay others.	MP to pay suppliers	42.888	< 0.001
		Receive MP from customers	48.980	< 0.001
	Mobile payments are safe to use to get paid.	MP to pay suppliers	49.293	< 0.001
		Receive MP from customers	41.794	< 0.001
PR	**My mobile service is reliable.**	MP to pay suppliers	50.890	< 0.001
		Receive MP from customers	41.568	< 0.001
	My mobile handset is reliable.	MP to pay suppliers	54.678	< 0.001
		Receive MP from customers	34.476	< 0.001

	Mobile payments are reliable.	MP to pay suppliers	60.651	< 0.001
		Receive MP from customers	63.733	< 0.001
PS	**I feel personally safer when I use mobile payments to pay rather than cash.**	MP to pay suppliers	48.742	< 0.001
		Receive MP from customers	47.026	< 0.001
PFC	**It does not cost me much to pay or get paid using my phone.**	MP to pay suppliers	13.414	< 0.001
		Receive MP from customers	16.623	< 0.001
	Overall, it is cheaper for me to pay with mobile payments than with other forms of payment.	MP to pay suppliers	12.881	< 0.001
		Receive MP from customers	15.422	< 0.001
SN	**People who are important to me think that I should use mobile payments.**	MP to pay suppliers	58.973	< 0.001
		Receive MP from customers	70.162	< 0.001

In order to test H8, the effects of using mobile payments to pay suppliers and to receive customer payments on business growth were evaluated. In this case, the increase in the number of new paid workers hired over the last 12 months and the number of customers over the last 12 months were used as measures of business growth. A bivariate correlation analysis was used to evaluate the relationships among said factors. The results of this correlation are displayed in Table 8.

Table 8: Correlations between Mobile Payment Use and Number of New Hires/Increase in Customers

		Mobile Payments to Suppliers	Mobile Payments Received	Number Hired	Number of More Customers
Mobile Payments to Suppliers	Pearson Correlation	1	0.497**	0.193**	0.250**
	Sig. (2-tailed)		< 0.001	0.004	< 0.001
	N	318	318	227	222
Mobile Payments Received	Pearson Correlation	0.497**	1	0.236**	0.153*
	Sig. (2-tailed)	< 0.001		< 0.001	0.021
	N	318	324	230	225
Number Hired	Pearson Correlation	0.193**	0.236**	1	0.152*
	Sig. (2-tailed)	0.004	< 0.001		0.032
	N	227	230	230	199
Number of More Customers	Pearson Correlation	0.250**	0.153*	0.152*	1
	Sig. (2-tailed)	< 0.001	0.021	0.032	
	N	222	225	199	225

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The results indicate a positive correlation between use of mobile payments to pay suppliers and number of paid workers hired and an increase in the number of customers. Similarly, receipt of payment via mobile phone correlates positively with the number of paid workers hired and an increase in the number of customers. An increase in the number of customers, which is likely to be a better indicator of business growth, correlates strongest with use of mobile payments to pay suppliers, a user-initiated action.

Additionally, the correlation between the business use of mobile payments and the growth in business income compared to last year was evaluated. The results of this evaluation are provided in Table 9. In this case, a positive correlation exists between use of mobile payments for paying suppliers and receiving payment from customers and the user's perception of increased business income. These results indicate that the usage of mobile payments for business

transactions not only correlate to user perceptions of business growth, but also increased customers and hiring, thereby confirming H8. Again, of the two types of business payments, paying suppliers via mobile phone correlates more strongly with business growth.

Table 9: Correlation between Mobile Payment Use and Business Income Growth in the Past Year

		Mobile Payments to Suppliers	Mobile Payments Received	Business Income Growth in the Past Year
Mobile Payments to Suppliers	Pearson Correlation	1	0.497**	0.410**
	Sig. (2-tailed)		< 0.001	< 0.001
	N	318	318	307
Mobile Payments Received	Pearson Correlation	0.497**	1	0.258**
	Sig. (2-tailed)	< 0.001		< 0.001
	N	318	324	313
Business Income Growth in the Past Year	Pearson Correlation	0.410**	0.258**	1
	Sig. (2-tailed)	< 0.001	< 0.001	
	N	307	313	313

**. Correlation is significant at the 0.01 level (2-tailed).

Test of TAM

This empirical study is exploratory in nature and thus the possible antecedent-consequence relationships in the research model were tested using multiple regression analysis. Multiple regression analysis is a statistical technique used to analyze the relationship between a single dependent variable and one or more independent variables. The regression analysis procedure weights each independent variable to ensure maximal prediction of the single dependent variable from the set of independent variables. The weights indicate the relative contribution of the independent variables to the prediction and the set of weighted independent variables forms the regression model. (Hair, Anderson, Tatham, & Black, 1998) IBM SPSS Statistical Package Version 19 was also used for this analysis.

To start, the variables are divided into dependent and independent variables. In this case, mobile payment use was related to five measured constructs. Specifically, "level of mobile payment usage to pay suppliers compared to last year" was used as the dependent variable. This was done because it gives a view of user-initiated mobile payment use (as opposed to receipt of payment by mobile phone, which is most likely to be initiated by the customer), degree of usage, and level of adoption. The following were employed as the independent variables: perceived usefulness, perceived ease of use, perceived trust, perceived safety, and subjective norm.

Details of the regression results are shown in Table 10. The R^2 value, or coefficient of determination, measures the proportion of the dependent variable's variance that is explained by the independent variables. (Hair et al., 1998) It provides indication of the model's predictive quality. For a properly applied and estimated regression model, it can be assumed that the higher the value of R^2, the greater the explanation of the regression equation. (Hair et al., 1998) The proposed TAM accounts for 34.6 percent of the variance in business use of mobile payments. In this case, perceived usefulness ($p < 0.001$), perceived trust ($p < 0.05$), perceived safety ($p < 0.05$), and subjective norm ($p < 0.05$) have significant positive effects on the business use of mobile payments. Perceived ease of use is almost statistically significant ($p < 0.06$) at the 5 percent level. Within the proposed extended TAM, perceived usefulness ($\beta = 0.244$) had the strongest influence on usage.

Table 10: Regression Results of Extended TAM

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-0.692	0.249		-2.780	0.006
MP useful in biz	0.441	0.115	0.244	3.844	< 0.001
MP easy to use	0.199	0.105	0.124	1.891	0.060
MP safe to pay others	0.252	0.114	0.144	2.202	0.028
MP safer than cash	0.211	0.090	0.139	2.350	0.019
Others think I should use MP	0.190	0.082	0.125	2.319	0.021
Adjusted R^2	0.346				

As shown in Table 11, both TAM and the extended TAM can be used to explain variance in the use of mobile payments for business purposes. While the original TAM accounts for 29.1 percent, the extended TAM explains 34.6 percent of the variance in usage. Both indicate that perceived usefulness and perceived ease of use influence business use of mobile payments. However, with the addition of perceived trust, perceived safety, and subjective norm, the value of R^2 increases, suggesting that the extended TAM provides an improvement in explanatory power.

Table 11: Comparing the Extended TAM to the Original TAM

TAM	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-0.252	0.241		-1.044	0.298
MP useful in biz	0.641	0.110	0.355	5.817	< 0.001
MP easy to use	0.400	0.099	0.248	1.059	< 0.001
Adjusted R2	0.291				
Extended TAM					
(Constant)	-0.692	0.249		-2.780	0.006
MP useful in biz	0.441	0.115	0.244	3.844	< 0.001
MP easy to use	0.199	0.105	0.124	1.891	0.060
MP safe to pay others	0.252	0.114	0.144	2.202	0.028
MP safer than cash	0.211	0.090	0.139	2.350	0.019
Others think I should use MP	0.190	0.082	0.125	2.319	0.021
Adjusted R^2	0.346				

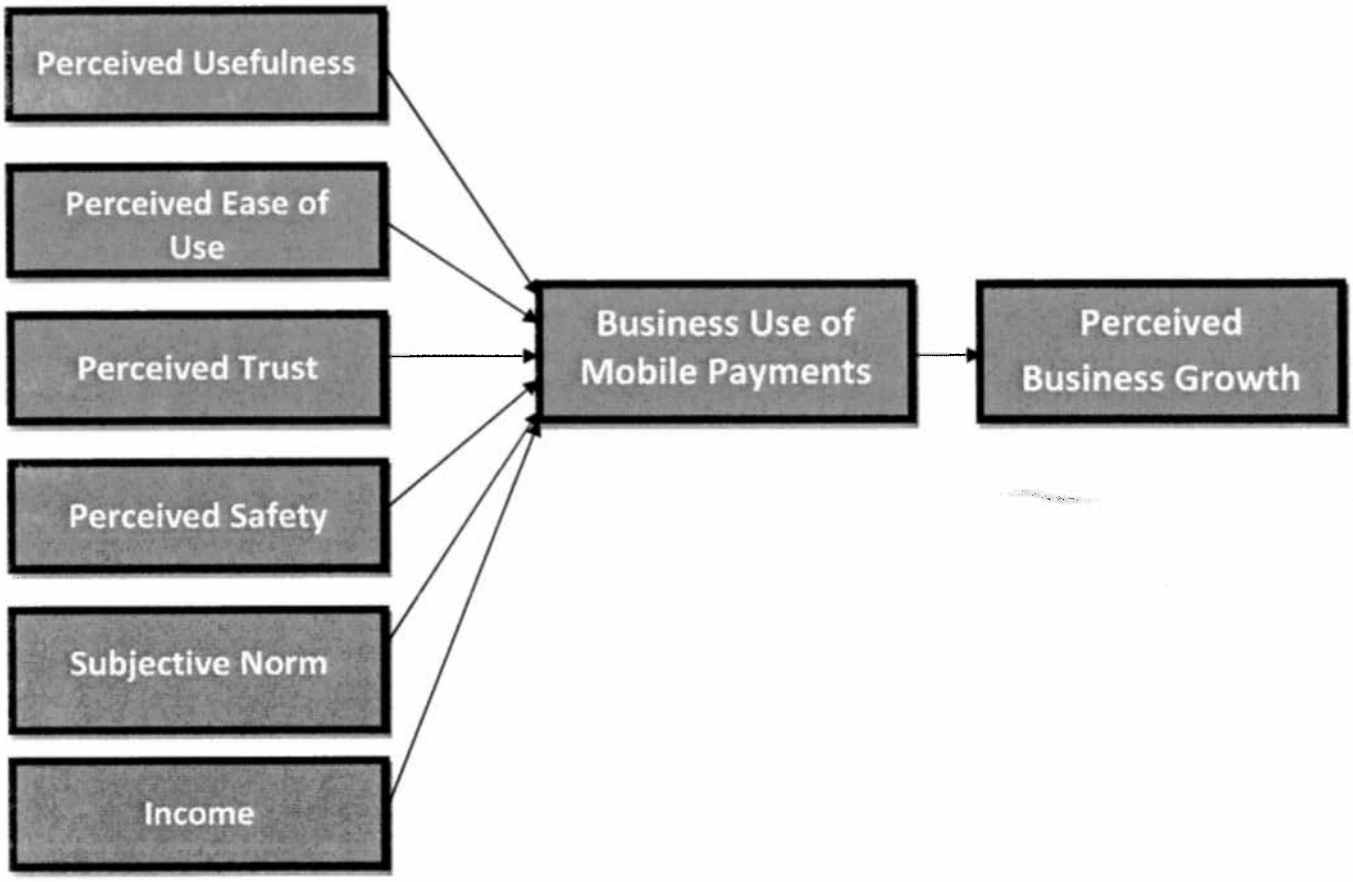
The regression analysis was also conducted with the addition of demographic variables: age, gender, education, and income. While age and gender were statistically non-significant, education and income were statistically significant. Prior studies have shown that in Western society, education and income are typically highly correlated. (Blanden, Gregg, & Machin, 2002) However, a correlation analysis shows that, in this study, education and income are not highly correlated ($r = 0.262$, $p < 0.01$). Thus each variable's effect on the model was evaluated separately. Income had the strongest effect on the model. Inclusion of the income variable resulted in an increase of the R^2 value to 0.444, indicating that the extended model with the income variable explains 44.4 percent of the variance in business use of mobile payments. In this case, all of the independent variables are statistically significant except for perceived safety, which is almost statistically significant at the 5 percent level ($p = 0.066$). This models show that income ($\beta = 0.254$) has a more significant effect on mobile usage than perceived usefulness ($\beta =$

0.149). Furthermore, perceived ease of use ($\beta = 0.172$) has a more significant effect on usage than perceived usefulness. Table 12 shows the results of the regression model including income and Figure 15 shows the revised research model.

Table 12: Regression Results of Extended TAM including Income

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-0.981	0.234		-4.193	< 0.001
MP useful in biz	0.262	0.109	0.149	2.395	< 0.001
MP easy to use	0.267	0.097	0.172	2.748	0.017
MP safe to pay others	0.246	0.109	0.144	2.259	0.006
MP safer than cash	0.163	0.088	0.107	1.845	0.066
Others think I should use MP	0.203	0.079	0.135	2.566	0.011
Income	0.163	0.046	0.254	5.237	< 0.001
Adjusted R^2	0.444				

Figure 15: Revised Research Model



The model was then tested using the dependent variable "level of mobile payment usage to receive payment from customers compared to last year". This variable also provides an indication of mobile payment usage for business purposes. Table 13 shows that when "level of mobile payment usage to receive payment from customers compared to last year" is used as the dependent variable, income ($\beta = 0.279$), perceived ease of use ($\beta = 0.221$), perceived safety ($\beta = 0.193$) have the most significant effects on usage. Overall, this regression model explains 53.9 percent of the variance in use of mobile payments for business purposes. While this regression model has a higher R^2 value than that of the regression model summarized in Table 12, the model in Table 12 is likely to be more reflective of microentrepreneurs' adoption of mobile payments for business purposes. As was mentioned earlier, the model in Table 12 uses the

dependent variable "level of mobile payment usage to pay suppliers compared to last year." This dependent variable pertains to an action that is likely to be initiated by the microentrepreneur and is more likely to be in his/her control. Therefore using the variable related to paying suppliers in the regression may be more suitable for predicting microentrepreneurs' adoption of mobile payments.

Table 13: Regression Results of Extended TAM with Income - "Customer Payments" as Dependent Variable

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.398	0.220		-6.353	< 0.001
MP useful in biz	0.214	0.101	0.119	2.112	0.036
MP easy to use	0.354	0.090	0.221	3.925	< 0.001
MP safe to get paid	0.191	0.093	0.112	2.066	0.040
MP safer than cash	0.305	0.082	0.193	3.714	< 0.001
Others think I should use MP	0.226	0.076	0.145	2.992	0.003
Income	0.273	0.043	0.279	6.311	< 0.001
Adjusted R^2	0.539				

Key Observations

The study reveals several key observations with respect to the development of mobile payments in sub-Saharan Africa and predicting business use of mobile payments via TAM. Differences in perceptions about mobile payments and level of personal experience with the product had a significant impact on mobile payment use by microentrepreneurs in Kenya and Tanzania. In Tanzania, the general lack of personal experience with mobile payments and lack of awareness of the product's utility had significant impacts on usage. This shows that despite the strong value proposition of mobile payments, before widespread adoption takes place, the

country-specific context as well as users' behaviors and attitudes must be understood and addressed.

The data also suggest that subjective norm plays a key role in mobile payment adoption and usage. In the absence of experiential data, users often look to social networks for evaluative information to increase familiarity with a product and to assess the product's trustworthiness. With first-hand experience, however, social normative influence loses its significance. (Gefen et al., 2003) This implies that the perspectives and opinions of trusted members of a social network with first-hand experience can play a vital role in increasing mobile payment adoption.

Prior studies have evaluated the use of ICT, linking mobile phone usage with streamlined marketing, sales, and procurement. Though some studies suggest that mobile phone use expands the size of markets by bringing a larger number of buyers and sellers into the marketplace, not all have found evidence that new customers were acquired. (Donner & Escobari, 2010) The current study suggests that usage of mobile payments for business purposes is linked to business growth. A microenterprise's use of mobile payments to pay suppliers and for receiving payments from customers has a significant effect on business income.

In particular, the use of mobile payments to pay suppliers correlated to an increase in business income compared to the previous year ($r = 0.410$, $p<0.01$). Similarly, for those that use mobile payments to pay suppliers more this year compared to last year, there is a correlation with an increase in business income compared to the previous year ($r = 0.467$, $p<0.01$). These results highlight the importance of mobile payments to microenterprises' supply chain, especially as it relates to paying suppliers. The ability to pay suppliers with mobile payments affords microenterprises improved supply chain efficiency – supply payment and delivery arrangements can be made over the phone. This is especially important to microentrepreneurs, who do not have

to stop business operations in order to pay for and pick up necessary supplies. For the suppliers, the ability to reliably receive payment from the microenterprises remotely can improve trust within the supply chain, thereby improving channel relationships. Microenterprises who pay suppliers reliably and consistently via mobile payments could achieve "preferred-status" among their suppliers, possibly resulting in lower prices and/or better service. Payment via mobile phone can also grant microenterprises access to suppliers beyond their local networks of business contacts; these new suppliers may offer better pricing and/or service. For microenterprises, frequent payment to suppliers is common because credit is not readily available. Thus these efficiency improvements afford lower cost of goods sold and more time dedicated to customers, both of which have the potential to increase profit and income. Paying suppliers is unlike a customer-initiated transaction, in which, the microenterprise might have to choose between accepting the mobile payment and losing revenue. Such transactions indicate some level of user initiative and point to more active use of mobile payments by microenterprises.

The study has extended TAM, taking into account the context of mobile payments in sub-Saharan Africa. In addition to perceived usefulness and perceived ease of use, other relevant factors influence the adoption of mobile payments. The results support the inclusion of perceived trust, perceived safety, subjective norm, and income.

Income appears to be a strong predictor of mobile payment use. Accordingly, microentrepreneurs with higher incomes are expected to show higher usage of mobile payments for business transactions. Microentrepreneurs with higher incomes may have more successful business operations and thus experience higher inventory turnover. These microentrepreneurs may have a greater interest in ways of reducing the time to complete tasks – receiving payments from customers, paying suppliers, arranging for delivery of supplies, transferring business funds

to formal bank accounts, etc. The value proposition of mobile payments with respect to speed and convenience is likely to be quite compelling to these types of microenterprises. Perceived ease of use is another significant variable in the proposed model. Widespread adoption of mobile payments for business use requires mobile payments with straightforward interfaces that are easy enough for a variety of users (microenterprises, suppliers, and customers) to manage.

As in the original TAM, perceived usefulness has a positive effect on usage. Since the introduction of mobile payments, mobile network operators have focused on P2P transfers. In order to attract more microenterprise customers, mobile network operators should focus on the value that mobile payment usage creates in terms of business growth, access to customers and suppliers, and convenience. Designing a clear, distinct message and value proposition targeting microentrepreneurs will allow mobile network operators to respond to unmet needs within this customer segment.

Microentrepreneurs' perception about the trustworthiness of mobile payments appears to be an indicator of mobile payment use. Users who trust that mobile payments are safe for paying and receiving payment are more likely to use mobile payments for business transactions. Again, microenterprises make frequent payments to suppliers and failure to pay or pay on-time can have an impact on supplier-microenterprise relations. Moreover, effectively managing working capital, in terms of speeding up the cycle from cash to inventory to receivables and back to cash, is crucial. (Higgins et al., 2012) Therefore, being able to trust that payments are both reaching suppliers and being received is critical to the health and sustainability of microenterprises.

The results show that one of the key differences among microentrepreneurs in Kenya and those in Tanzania in terms of mobile payment use was personal experience with the technology. While Kenyans had personal experience which informed their use of mobile payments in the

business, Tanzanians often had not had direct experience with mobile payments. The significant positive effect of subjective norm on mobile payment use shows support for increased interactions between experienced mobile payment users within a community and inexperienced users. Mobile network operators must not ignore the effect of subjective norm, particularly in societies in which face-to-face interactions are valued and informational challenges (absence, uncertainty, and asymmetry) are common.

Perceived personal safety also emerged as a variable to be considered. Even though cash is widely used for various receipts and payments, mobile payments provide users with an added sense of personal security.

Overall, the findings suggest that attracting more microenterprise users requires more than just a focus on ease of use and usefulness. Marketing strategies that address user perceptions of ease of use and usefulness as well as trustworthiness are imperative. Strategies geared towards increased adoption should also take into account the impact of subjective norm, which may be particularly helpful in addressing misperceptions. In addition, promoting the benefits of mobile payments in terms of personal safety and business income growth will highlight the value of this technology beyond basic utility.

CHAPTER 5: IMPLICATIONS AND CONCLUSION

Despite the heightened interest in mobile payments, there has been little scholarly research on the adoption and impact of such systems in the developing world. (Donner & Tellez, 2008; Maurer, 2008) Furthermore, studies investigating how microenterprises in the developing world utilize mobile telephony have been relatively scarce. (Donner, 2008) Nevertheless, the phenomenal success of M-PESA, along with the growth of the mobile payment systems presented earlier, is indicative of an emerging mobile payments sector within sub-Saharan Africa. Mounting private sector interest in payment systems in sub-Saharan Africa is evidenced by recent openings of regional offices in Nairobi by Visa, Inc. and MasterCard Worldwide, two global titans of electronic payments. (Ombok, 2012; MasterCard Worldwide, 2012) Google has recently introduced Beba, an NFC-enabled payment card designed to facilitate fare payment on *matatus*, Kenya's commuter buses. (Matthews, 2012) The current exploratory study aims to add to the growing body of literature by assessing adoption factors and the impact of mobile payments on business development and wealth creation in the developing world. By comparing and contrasting the situations in Kenya and Tanzania, it also provides insight into strategies that may bring sub-Saharan Africa closer to realizing the full potential of mobile payments.

Implications for Research

This study contributes to existing literature in a number of ways. It has extended TAM to include constructs that reflect users' concerns with trust, personal safety, and subjective norm. Prior research has investigated these constructs independently and some of them simultaneously. This study, however, integrates these constructs and empirically examines their influence on the adoption of mobile payments for business transactions. The hypothesized relationships between the constructs and mobile payments were largely supported by the data. Furthermore, this study is consistent with prior research, confirming the positive effect that perceived usefulness and

perceived ease of use have on technology adoption. This work also substantiates Luarn and Lin's (2005) research which found perceived trust to be an antecedent to behavioral intention to use mobile banking. As such, the findings suggest that the proposed TAM extension is appropriate for understanding users' perceptions of and ultimate use of mobile payments.

Moreover, the original TAM and a majority of the TAM extensions highlighted in the literature review are based on empirical studies conducted in developed economies. This study contributes to the existing literature by highlighting key adoption factors within the context of developing economies. This research has shown that the additional constructs of perceived trust, perceived safety, and subjective norm indeed have effects on adoption and use of mobile payments for business transactions.

Furthermore, this work builds on the extant development literature that seeks to understand the impact of mobile telephony on microenterprises in developing economies. (Chew et al., 2011; Duncombe & Heeks, 1999, 2005; Duncombe, 2007; Jagun et al., 2008) Like the research of Higgins et al. (2012), which investigated the mobile payment usage patterns of Kenyan small and medium-sized enterprises, this study confirms certain usage patterns among microentrepreneurs. Specifically, microentrepreneurs primarily use mobile payments to receive payment from customers, whereas they utilize mobile payments to pay employees very rarely. This work further confirms their findings of the importance of microentrepreneurs' use of mobile payments to their supply chains. In some cases, microentrepreneurs are prompted to accept mobile payments at the request of customers and in other cases they encourage customers to use mobile payments. This study, however, goes one step further and examines the economic impact of mobile payment use. The findings indicate that mobile payment usage does have a positive impact on microenterprises with respect to the outcome variables of increased income and

customers as well as additional hiring. Finally, this is the first study that compares and contrasts the adoption of mobile payments and the impact of adoption on microenterprises in Kenya and Tanzania.

Further research is needed to generalize such findings. Nevertheless, the outcomes of this study provide insight into avenues for further research. As has been noted in the literature, mobile technology adoption and more specifically mobile payment adoption remains a relatively new field for researchers, with little scholarly research on such topics. (Donner & Tellez, 2009; Luarn & Lin, 2005; Maurer, 2008; Meso et al., 2005) The findings of this study are based on research conducted in urbanized areas of only two sub-Saharan African countries. In order to generalize these results, continued research in other regions of the developing world is needed. Additionally, the applicability of the proposed model to other m-services (mobile banking, mobile supply chain management, mobile agriculture, etc.) provides another interesting avenue for research. There has been recent interest in the use of mobile payments for the disbursement and repayment of microloans. (Economist, 2013) It would be worthwhile to investigate whether or not efficiency improvements may reduce loan servicing costs, resulting in lower interest rates for microentrepreneurs.

Furthermore, this research is heavily biased towards urban, formal microenterprises, many of which have access to formal banking services. Extending the survey to include rural and informal microenterprises, more of which are likely to be unbanked, would deepen the current understanding of the factors influencing mobile payment adoption and economic impact.

This study measured perceptions at a single point in time. Longitudinal evidence, once the market has stabilized, would provide insight into how perceptions and usage patterns of mobile payments change as they become increasingly commonplace in the developing world.

Longitudinal evidence would also help in assessing the long-term economic impact of mobile payments on microenterprises. The study did not examine gender differences in mobile payment use, adoption, and impact. A great deal of development work has been aimed at achieving gender parity in terms of health, empowerment, and economic activity. Given the vulnerability of women in many societies, are they more comfortable transacting with mobile payments than with cash, given the relative security and safety associated with mobile payments? Further investigation into the effect of mobile payment use and adoption on the economic outcomes of women microentrepreneurs is merited. Prior research on the adoption of ICT has investigated the role of perceived cultural influences and perceived self-efficacy, the judgment of one's ability to use a technology. (Luarn & Lin, 2005; Meso et al., 2005) These and other constructs may further expand the applicability of the proposed model. Finally, the current study is exploratory in nature. Thus future research to examine the causality and interrelationships between the variables is recommended – specifically the effects of perceived trust, perceived safety, and subjective norm on perceived usefulness.

Implications for Practice

Unlocking the full potential of mobile payments requires that mobile network operators implement strategies that are specific to the sub-Saharan African context. Adopting traditional marketing strategies from the developed world are unlikely to have the intended impact. Understanding the unique needs of the users is a crucial step. In this context, a number of notable adoption factors have been highlighted.

Though many of the interviewees noted that mobile payment fraud incidents are rare, it remains an important concern of microentrepreneurs. In Kenya, microentrepreneurs recounted stories of customers purchasing goods or services using mobile payments, only to have the transaction reversed moments later via the mobile network operator's customer service line. In

these cases, the microentrepreneur is not informed or consulted prior to the payment reversal. In Tanzania, microentrepreneurs reported receiving phony messages from a customer's phone confirming that the mobile payment transaction had been processed. Moreover, some microentrepreneurs were reluctant to accept mobile payments due to fraud. In Nairobi, one salon posted a sign stating that if a client intends to pay with M-PESA, the payment must be processed prior to the receipt of services. Fear of fraud diminishes trust and, as was noted, trust is a particularly important factor in the adoption of mobile services. (Wang et al., 2006) As Mas and Ng'weno (2012) suggest, in order to bolster trust in, and use of, mobile payments by businesses, mobile network operators must improve policies involving transaction reversals. Mobile network operators could look into security guarantees and making the reversal process more formal by contacting the business owner and having the customer file an official request for reimbursement.

Interviewees also discussed concerns with network reliability. At a travel agency in Nairobi, one employee reported experiencing network outages while booking a client's flight. In such cases, if the payment cannot be processed rapidly, the client may miss out on a low fare or an available seat. Such outages have gained attention in the popular press. In 2012, M-PESA services in Kenya were disrupted due to a power outage on a Vodafone server in Germany. (Clayton, 2012) In March 2013, M-PESA service in Tanzania was stalled for nearly two days as a result of technical malfunctions. (Kasumuni, 2013) Issues with network reliability also impact trust. Here, investment in improving network capacity and reliability is suggested.

Furthermore, the data suggest that perceived financial cost is an important consideration in mobile payment adoption. Microenterprises often deal with relatively small payment amounts, especially in the service and retail sectors. Interviewees explained that transaction costs on small

payments can be an issue for them. It is suggested that promotions and creative pricing, possibly linked to usage intensity, may encourage greater usage of mobile payments for business transactions among microenterprises.

Given the diversity and complexity within sub-Saharan Africa, the results highlight some of the adoption factors that have inhibited usage of mobile payments. The results indicate that personal experience level with mobile payments has a positive influence on adoption. Those with less experience using mobile payments were less likely to perceive the technology as having a positive impact on business outcomes. They were also less likely to believe that learning how to use the technology would be easy. These less than favorable perceptions toward mobile payments thereby reduce the likelihood of adoption.

Grameen Foundation's Community Knowledge Worker (CKW) program involves recruiting and training rural community members as CKWs. The CKWs then use basic smartphones loaded with an application that helps them provide information services to their fellow farmers. (Grameen Foundation, 2012) An adaptation of this model could be beneficial in the mobile payment context. In Tanzania, a number of microentrepreneurs and their customers lack personal experience with mobile payments and are not particularly trusting of mobile payments. Mobile network operators in Tanzania should invest in a "street team". The street team would consist of individuals (possibly local microentrepreneurs) recruited and trained by the mobile network operator to educate consumers and businesses on the use of mobile payments. While advertising campaigns are typically used to build customer awareness in Western societies, Molony's (2006) work underscores the importance of face-to-face contact for building trust in the African business environment. Furthermore, the results of this study confirm the importance of social influence through the measure of subjective norm. The use of a well-

trained, trusted street team, as in the Grameen Foundation's CKW model could prove to be instrumental in educating the market.

Even though most of the Kenyan microentrepreneurs in the sample had personal experience with mobile payments, the street team approach could also be beneficial in this environment. The focus would not be so much on basic use as it would be on how to best exploit mobile payments for business growth. In the interviews, some microentrepreneurs in Nairobi reported receiving mobile payment for goods and services provided to customers as far away as Mombasa or Nakuru, 310 and 100 miles distant, respectively. The initial contact was made either while the customer was visiting Nairobi or through the business's Facebook page. Mas and Ng'weno (2012) discuss many reasons that underlie businesses' suboptimal use of M-PESA related services such as Buy Goods and bulk payments. The microentrepreneurs contacted for this study seemed to be largely unaware of such services. However, during one interview, the manager of a hair salon noted that he was no longer worried about fraud as the business used Buy Goods through Kopo Kopo Inc. Kopo Kopo co-markets with Safaricom to bring the M-PESA Buy Goods service to small and medium-sized businesses in Kenya and offers additional services such as transaction reports and customer tracking. (Kopo Kopo, Inc., 2013) As Mas and Ng'weno (2012) explain, transactions made with mobile payments provide a wealth of information related to credit and business risk. It appears as if Safaricom is already using patterns of airtime usage to evaluate customers' creditworthiness for M-Shwari loans. (McCarty, 2012) Similar mobile payment information, if aggregated and provided as a service, could help microentrepreneurs determine the risk and creditworthiness associated with their customers. Street team members could educate microentrepreneurs about these features, which could increase microentrepreneurs' market reach and overall usage of mobile payments.

Microenterprises occupy a crucial position in the supply chain of goods and services. They have access to both customers and suppliers. They engage in both payment and receipt of payment. Such positioning emphasizes their importance in furthering the adoption and use of mobile payments. While mobile network operators have experienced success with P2P transfers, the results of this study indicate that mobile network operators may be missing out on an opportunity to satisfy a critical market need with respect to B2C, C2B, and B2B transactions. Investment in the aforementioned strategies is likely to result in increased mobile payment adoption and use by microenterprises, ultimately providing mobile network operators with pay-offs in terms of greater network effects, strengthened customer loyalty, and higher revenues.

Conclusion

Mobile payments, also referred to as "mobile money", have experienced impressive growth in recent years. In 2012, nearly 30 million active users performed transactions totaling US$4.6 billion. These figures are poised for continued growth as the number of active customer accounts is expanding at an annualized rate of 167.6 percent. The expansion of mobile payments has global importance as 56 percent of mobile payment deployments are concentrated in the developing economies of sub-Saharan Africa. (Pénicaud, 2013) Though the primary mobile payment transactions involve airtime top-ups and P2P transfers, mobile payments are also used for B2C, C2B, and B2B transactions. For microenterprises, which typically have little access to electronic payment methods, the use of mobile payments is of particular interest.

This exploratory study has presented an analysis of mobile payment adoption, usage, and economic impact, specifically within the context of microenterprises in developing economies. The research began by identifying and then addressing two research questions. The first centered on isolating the technology acceptance factors related to mobile payment adoption by microentrepreneurs in Kenya and Tanzania and assessing the relative influence of these factors.

The proposed hypotheses pertaining to the effect of perceived usefulness, perceived trust, perceived reliability, perceived safety, perceived financial cost, and subjective norm on mobile payment usage by microentrepreneurs were all supported. The hypotheses related to perceived ease of use was partially supported. This indicates that a number of factors must be considered for effective mobile payment adoption in this context.

Marked differences in attitudes and behaviors between Kenyan and Tanzanian microentrepreneurs were also observed. Tanzanian microentrepreneurs, who on average began using mobile payments nine months ago, demonstrated less usage of mobile payments for business transactions than Kenyan microentrepreneurs, who began using mobile payments over three years ago. Tanzanians had less personal experience with mobile payments and thus less favorable views of the benefits of mobile payments on their businesses. What does this data tell us? It should first be noted that in the world of mobile payment deployments, Kenya's rapid uptake and degree of usage remains a relative outlier. The amount of money that moves through many mobile payment systems is significantly lower than that of Tanzania, let alone Kenya. (Pénicaud, 2013) Thus understanding the factors inhibiting mobile payment adoption in a market like Tanzania can inform stakeholders on concrete steps needed to advance adoption in other developing markets as well as low-adoption, rural areas of Kenya and Tanzania.

The second research question related to the impact of mobile payment adoption on perceived microenterprise growth. The data support the link between mobile payment usage and business growth. This study finds correlations between the level of usage of mobile payment for paying suppliers/receiving payment from customers and the number of new hires, increase in the number of customers, and business income growth. The correlation was highest between the level of usage of mobile payment for paying suppliers and business income growth. This

observation along with the data related to mobile payment adoption factors implies that in some cases microentrepreneurs have yet to fully exploit the benefits of mobile payments. Here lies an opportunity for mobile network operators, governmental authorities, and other interested parties to work in collaboration to directly impact the development of mobile merchant payments and thereby positively impact economic development. Thus far, mobile network operators have devoted few resources to truly developing their business services. (Mas & Ng'weno, 2012) Governmental authorities could incentivize mobile network operators to develop mobile payment business services geared towards microenterprises. The growth of microenterprises has important implications given the multiplier effect. Rising incomes for microenterprises improves not only the economic standing of the microentrepreneurs and their families but also that of potential new hires. As was aforementioned, trust is an important adoption factor in this context. Bolstering trust in mobile payments may also call for regulatory authorities to look into the transaction reversal practices of money mobile operators as it relates to fraud. (Mas & Ng'weno, 2012)

This thesis also proposes a model for mobile payment adoption. Specifically, the TAM model was adapted and applied to the adoption of mobile payments in developing economies. This thesis has made a case for the inclusion of constructs in addition to the traditional TAM constructs of perceived usefulness and perceived ease of use. The addition of perceived trust, perceived safety, and subjective norm explains usage from the perspective of users in developing economies. Moreover, including income as a construct reveals the virtuous cycle tied to mobile payment use – as income increases, microenterprises are more likely to use mobile payments; as microenterprises use mobile payments, the more likely they are to witness income increases. Improving user perception of trust and safety, while taking into account subjective norm, can

provide insight into effective marketing and communication strategies targeted at populations who may have difficulty understanding the benefits and use of mobile payments.

In order for microenterprises to thrive and grow, they need access to new markets and working capital. While this study has shown a correlation between mobile payment use and business income growth, mobile payments are no silver bullet. Nevertheless, mobile payments provide benefits and have the potential for growth, especially among microentrepreneurs in developing economies. Increasing mobile payment usage is one strategy, among many, that should be seriously considered as a means of raising the fortunes of those at the base of the pyramid (BoP). The research shows that there is a gap between the actual benefits of mobile payments and users' perceptions and ultimate usage of the product. For many individuals at the BoP, adopting new technology is a risk that requires a leap of faith as they navigate away from the systems and practices they already know. Closing this gap will require mutual learning, collaboration, and communication between various stakeholders: mobile network operators, government authorities, and early-adopters/thought leaders within these markets.

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APPENDIX 1

PROVIDENCE COLLEGE

SCHOOL OF BUSINESS

KENYA - MOBILE PAYMENT SURVEY

Which of the following categories best describes this business?	Retail	Services	Trade	Manufacturing
Please describe your product/services/trade:	_____			
How many years ago was this business started?	_____			
How many workers does this business have? (other than you)	_____			
How many paid workers does this business have? (other than you)	_____			
About how many businesses sell goods/services to this business?	_____			
About how many customers does this business have per week?	_____			
Does this business have a:	Formal banking account		Credit card	
Do you have/own a mobile phone?	Yes		No	
How many people share this phone?	_____			
How long ago did you begin using mobile payments for your business?	_____			
What types of business purchases do you make using mobile payments?	_____			

	None	Less than half	Half	More than half	All
How much of this business's transactions do you conduct yourself?	1	2	3	4	5
How much money do you keep in your business's mobile payment account?	1	2	3	4	5
How many people who sell you goods/services accept mobile payments?	1	2	3	4	5

	Never	Less than half of the time	Half of the time	More than half of the time	All of the time
How much do you use your mobile phone for business purposes?	1	2	3	4	5
How often do you use mobile payments to pay people who sell you goods/services?	1	2	3	4	5
How often do you use mobile payments to pay employees?	1	2	3	4	5
How often do you use mobile payments to pay the government (taxes, fees, etc.)?	1	2	3	4	5
How often do you use mobile payments to receive payment from customers?	1	2	3	4	5

	Disagree	Neither Disagree nor Agree	Agree
Using mobile payments improves my performance in conducting business.	1	2	3
Mobile payments are useful in doing business.	1	2	3
Getting the money to people is faster when I use a mobile phone.	1	2	3
Learning to use mobile payments was easy for me.	1	2	3
Mobile payments are easy to use.	1	2	3
Using mobile payments takes too much time from normal duties.	1	2	3
Working with mobile payments is very complicated.	1	2	3
The mobile phone company is trustworthy.	1	2	3
I think my money will be safe when I receive it on my phone.	1	2	3

	Disagree	Neither Disagree nor Agree	Agree
I trust the agent who takes my money will treat me fairly and not charge too much.	1	2	3
Mobile payments are safe to use to pay others.	1	2	3
Mobile payments are safe to use to get paid.	1	2	3
I feel personally safer when I use mobile payments to pay rather than cash.	1	2	3
My mobile service is reliable.	1	2	3
My mobile handset is reliable.	1	2	3
Mobile payments are reliable.	1	2	3
It does not cost me much to pay or get paid using my phone.	1	2	3
Overall, it is cheaper for me to pay with mobile payments than with other forms of payment.	1	2	3
People who are important to me think that I should use mobile payments.	1	2	3
Using mobile payments has helped my business grow.	1	2	3

Compared to last year, the income of this business is:	Much lower	Lower	About the same	Higher	Much higher
Compared to last year, how often do you use mobile payments to pay people who sell you goods/services?	A lot less	Less	About the same	More	Much more
Compared to last year, how often do you use mobile payments to receive payment from customers?	A lot less	Less	About the same	More	Much more
In the past year, did you hire more paid employees because you had more work?	Yes	No			
How many?	_____				
Do you have more customers compared to last year?	Yes	No			
How many more?	_____				

Gender	M	F			
Age group	under 20	20 – under 35	35 – under 55	55 and above	
Education level	No formal schooling	Primary school certificate	Secondary school certificate	Bachelor's degree or equivalent	Graduate degree or equivalent
Monthly income	Less than KSh10,100	KSh10,100 to less than KSh20,000	KSh20,000 to less than KSh30,000	KSh30,000 to less than KSh39,000	KSh39,000 or more
What is your role in the business? (circle all that apply)	Owner	Hire and manage workers	Handle cash transactions	Interact with customers	Interact with suppliers
Do you have a government license of any kind for your business?	Yes	No			

APPENDIX 2

PROVIDENCE
COLLEGE

SCHOOL OF BUSINESS

TANZANIA - MOBILE PAYMENT SURVEY

Which of the following categories best describes this business?	Retail Services Trade Manufacturing
Please describe your product/services/trade:	_____
How many years ago was this business started?	_____
How many workers does this business have? (other than you)	_____
How many paid workers does this business have? (other than you)	_____
About how many businesses sell goods/services to this business?	_____
About how many customers does this business have per week?	_____
Does this business have a:	Formal banking account Credit card
Do you have/own a mobile phone?	Yes No
How many people share this phone?	_____
How long ago did you begin using mobile payments for your business?	_____
What types of business purchases do you make using mobile payments?	_____

	None	Less than half	Half	More than half	All
How much of this business's transactions do you conduct yourself?	1	2	3	4	5
How much money do you keep in your business's mobile payment account?	1	2	3	4	5
How many people who sell you goods/services accept mobile payments?	1	2	3	4	5

	Never	Less than half of the time	Half of the time	More than half of the time	All of the time
How much do you use your mobile phone for business purposes?	1	2	3	4	5
How often do you use mobile payments to pay people who sell you goods/services?	1	2	3	4	5
How often do you use mobile payments to pay employees?	1	2	3	4	5
How often do you use mobile payments to pay the government (taxes, fees, etc.)?	1	2	3	4	5
How often do you use mobile payments to receive payment from customers?	1	2	3	4	5

	Disagree	Neither Disagree nor Agree	Agree
Using mobile payments would improve my performance in conducting business.	1	2	3
Mobile payments are useful in doing business.	1	2	3
Getting the money to people would be faster if I use a mobile phone.	1	2	3
Learning to use mobile payments would be easy for me.	1	2	3
Mobile payments are easy to use.	1	2	3
Using mobile payments takes too much time from normal duties.	1	2	3
Working with mobile payments is very complicated.	1	2	3
The mobile phone company is trustworthy.	1	2	3

	Disagree	Neither Disagree nor Agree	Agree
I think my money will be safe when I receive it on my phone.	1	2	3
I trust the agent who takes my money will treat me fairly and not charge too much.	1	2	3
Mobile payments are safe to use to pay others.	1	2	3
Mobile payments are safe to use to get paid.	1	2	3
I feel personally safer when I use mobile payments to pay rather than cash.	1	2	3
My mobile service is reliable.	1	2	3
My mobile handset is reliable.	1	2	3
Mobile payments are reliable.	1	2	3
It does not cost me much to pay or get paid using my phone.	1	2	3
Overall, it is cheaper for me to pay with mobile payments than with other forms of payment.	1	2	3
People who are important to me think that I should use mobile payments.	1	2	3
Using mobile payments has helped my business grow.	1	2	3

Compared to last year, the income of this business is:	Much lower	Lower	About the same	Higher	Much higher
Compared to last year, how often do you use mobile payments to pay people who sell you goods/services?	A lot less	Less	About the same	More	Much more
Compared to last year, how often do you use mobile payments to receive payment from customers?	A lot less	Less	About the same	More	Much more
In the past year, did you hire more paid employees because you had more work?	Yes	No			
How many?	_____				
Do you have more customers compared to last year?	Yes	No			
How many more?	_____				

Gender	M	F			
Age group	under 20	20 – under 35	35 – under 55	55 and above	
Education level	No formal schooling	Primary school certificate	Secondary school certificate	Bachelor's degree or equivalent	Graduate degree or equivalent
Monthly income	Less than TSh170,000	TSh170,000 to less than TSh360,000	TSh360,000 to less than TSh540,000	TSh540,000 to less than TSh720,000	TSh720,000 or more
What is your role in the business? (circle all that apply)	Owner	Hire and manage workers	Handle cash transactions	Interact with customers	Interact with suppliers
Do you have a government license of any kind for your business?	Yes	No			

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MOBILE PAYMENT INTERVIEW GUIDE

Introduction - Explanation of In-depth Interview

Jambo! My name is _____ and I am researching the use of mobile phones to make payments in Kenya and Tanzania. I would like to understand how small businesses (10 workers or fewer) like yours pay using a mobile phone. You were selected at random because you are a small business/owner in Nairobi/Dar es Salaam.

Guidelines

The interview should take about 15-20 minutes. Please understand that there is no right or wrong answer to any of the questions. All of your responses will be kept confidential and there is no identifying information that will link your answers directly to you. This means that your interview responses will only be shared with research team members and we will ensure that any information we include in our report does not identify you as the respondent. Please be as honest and candid as possible. If there is something you do not understand, please just ask. Remember, you don't have to talk about anything you don't want to and you may end the interview at any time.

Are there any questions about what I have just explained?

Are you willing to participate in this interview?

Interview Prompts

1. Please tell a little about the business and your role. (e.g., type of business, number of workers paid/unpaid, number of suppliers, number of customers, etc.)
2. How and when do you use your mobile phone to make payments for your business?
3. Tell me about positive experiences you've had paying with your mobile phone (for your business)?
4. Tell me about disappointments you've had paying with your mobile phone (for your business)?
5. What is your deepest concern about using your mobile phone to make payments for your business?
6. If there was one thing you could change about using your mobile phone to make payments for your business, what would it be?
7. What has helped you in using your mobile phone to make payments for your business? (e.g., government regulations/laws, political environment, culture, technology, competition from other businesses, customers, suppliers) Why?
8. Which of these has been most helpful?
9. What has made it easy for you to use your mobile phone to make payments for your business? (e.g., government regulations/laws, political environment, culture, technology, competition from other businesses, customers, suppliers) Why?
10. Which of these has made it easiest to use your mobile phone to make payments for your business?
11. What has made it hard for you to use your mobile phone to make payments for your business? (e.g., government regulations/laws, political environment, culture, technology, competition from other businesses, customers, suppliers) Why?
12. Which of these has made it hardest to use your mobile phone to make payments for your business?
13. How has using your mobile phone to make payments for your business changed the way you do business? Is this a good thing or a bad thing?
14. How has using your mobile phone to make payments for your business affected the success of your business?
15. How do you measure success? (e.g., more time, more money, more people working for them, more efficiency in doing business, etc.)
16. Is there anything more you would like to add about using your mobile phone to make payments for your business?